Benchmarking a Hybrid Multi Level Single Linkage Algorithm on the BBOB Noiseless Testbed

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ABSTRACT

Multi Level Single Linkage (MLSL) is a well known stochastic global optimization method. In this paper, a new hybrid variant (HMLSL) of the MLSL algorithm is presented. The most important improvements are related to the sampling phase: the sample is generated from a Sobol quasi-random sequence and a few percent of the population is further improved by using crossover and mutation operators like in a traditional differential evolution (DE) method.

The aim of this study is to evaluate the performance of the new HMLSL algorithm on the testbed of 24 noiseless functions. The new algorithm is also compared against a simple MLSL and a traditional DE in order to identify the benefits of the applied improvements.

The results confirm that the HMLSL outperforms the MLSL and DE methods. The new method has a larger probability of success and usually is faster especially in the final stage of the optimization than the other two algorithms.

Categories and Subject Descriptors

G.1.6 [Numerical Analysis]: Optimization—global optimization, unconstrained optimization; F.2.1 [Analysis of Algorithms and Problem Complexity]: Numerical Algorithms and Problems

General Terms

Algorithms

Keywords

Benchmarking, Black-box optimization, Multi level methods, Differential evolution

1. INTRODUCTION

The Multi Level Single Linkage (MLSL) [12] method has been derived from clustering [1] methods which enable the exploration of the whole feasible region through random

GECCO'13 Companion, July 6–10, 2013, Amsterdam, The Netherlands. Copyright 2013 ACM 978-1-4503-1964-5/13/07 ...\$15.00. sampling followed by local search methods. It is considered one of the best known and efficient stochastic algorithm for global optimization problems of moderate size of dimensions. A similar clustering type algorithm [2] achieved good results [5] on the BBOB-2009 functions with moderate number of local minima using a small budget of function evaluations.

In this paper, we introduce a new hybrid variant of the MLSL method denoted by HMLSL. The most important improvements are related two the sampling phase: the sample is generated from a Sobol quasi-random sequence [7] and a few percent of the sample is further improved using crossover and mutation operators like in a traditional differential evolution (DE) [13] method.

The purpose of this paper is to evaluate the performance of the HMLSL algorithm using the COCO framework [4] and to assess the benefits of the introduced improvements. We also compare the HMLSL method against a simple MLSL and a traditional DE method.

The rest of this article is organized as follows. Section 2 reviews the MLSL algorithm, and also presents the new hybrid version of the MLSL and DE methods. In Section 3, we describe the experiment design together with the algorithms parameter settings. The results are presented in Section 4 and discussed in Section 5. Section 6 concludes the paper and points out some directions for future work.

2. ALGORITHM PRESENTATION

Similarly to the clustering methods, MLSL has two phases: a global and a local one. The global phase consists of sampling, while the local phase is based on local searches. The local minimizer points are found by means of a local search procedure (LS), starting from appropriately chosen points from the sample drawn uniformly within the set of feasibility. The local search procedure is applied to every sample point from the reduced sample, except if there is another sample point within some critical distance r_k , which has a lower function value (see Algorithm 1). The reduced sample consists of the γkN best points $(0 < \gamma \le 1)$ from the cumulated sample x_1, \ldots, x_{kN} . The critical distance will be chosen to depend on kN only so as to minimize the probabilities of two possible failures of the method: the probability that a local search is started, although the resulting minimum is known already, and the probability that no local search is started in a level set which contains reduced sample points.

The critical distance is given by the following formula

$$r_k(x) = \frac{1}{\sqrt{\pi}} \left(\Gamma(1 + \frac{n}{2}) \cdot m(X) \cdot \frac{\zeta \ln(kN)}{kN} \right)^{1/n},$$

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Algorithm 1: The MLSL algorithm

 1
 $X^* \leftarrow \emptyset; k \leftarrow 0$

 2
 repeat

 3
 $k \leftarrow k + 1$

 4
 Generate N points $x_{(k-1)N+1}, \dots, x_{kN}$ with uniform distribution on X.

 5
 Determine the reduced sample (X_r) consisting of the γkN best points from the cumulated sample x_1, \dots, x_{kN} .

 6
 for $i \leftarrow 1$ to length (X_r) do

 7
 if NOT (there is such a j that $f(x_j) < f(x_i)$

 $\begin{array}{c|c} \mathbf{x} & \text{if } \mathbf{x} \in \mathcal{I}_{S}(x_{i}) \\ \text{and } \|x_{j} - x_{i}\| < r_{k} \\ \text{ then} \\ \mathbf{x} \\ \mathbf{y} \\ \mathbf{x} \\$

 $\begin{array}{c|c} \mathbf{9} \\ \mathbf{10} \\ \end{array} \qquad \qquad \begin{array}{c|c} x^* \leftarrow LS(x_i) \\ X^* \leftarrow X^* \cup \{x^*\} \end{array}$

11 until Some global stopping rule is satisfied.

12 return The smallest local minimum value found.

where Γ is the gamma function, *n* is the number of variables of the problem, m(X) is the Lebesgue measure of the domain *X*, kN is the total number of sampled points, *k* is the iteration counter and ζ is some positive constant.

The algorithm continues repeating the global and local phases until some stopping rule is satisfied. It has been proved that the algorithm has good asymptotic properties (depending on the ζ value): the asymptotic probabilistic correctness and probabilistic guarantee of finding all local minimizers. In our calculations the parameter ζ was taken to be 2.

Based on the presented MLSL method, we introduced some improvements which are mainly related to the global step of the algorithm. Low-discrepancy sequences have been used instead of purely random samples. We use sample points from Sobol quasi-random sequences [7] which fill the space more uniformly. Sobol low-discrepancy sequences are superior to pseudorandom sampling especially for low and moderately dimensional problems [8].

Furthermore a few percent of the sample points are improved by using crossover and mutation operators similar to those used in the DE method. In other words, a few DE iterations are applied to the best points of the actual sample. This last step is executed in each iteration before the local phase of the optimization. The aim of these improvements are to help the MLSL method to overcome the difficulties arising in problems with a large number of local optima or in the cases when the local search method cannot make further improvements.

3. EXPERIMENTAL PROCEDURE

The main purpose of the experiment is to assess the benefits of the improvements applied to the MLSL method. Thus we compare the three algorithms on the noiseless function testbed. Each of the algorithms was run on 15 instances of all the 24 functions in dimensions 2, 3, 5, 10, and 20. The evaluations budget was set to $2 \cdot 10^4 D$ for each run. The applied budget is enough to capture all relevant features of the three algorithms.

MLSL has four parameters to set: the number of sample points in an iteration, the size of the reduced sample, the maximum number of function evaluations for local search, and the used local search procedure. The sample size in each iteration was set to 50D, while the size of the reduced sample to 5D. This latter setting is also motivated by the same population size of the DE method (see below). On the whole testbed we use the MATLAB's fmincon local search method in all dimensions. fmincon is an interior-point algorithm for constrained nonlinear problems which approximates the gradient using the finite difference method and based on a recent study [9], it performed well on most of the test functions. The maximum number of function evaluations for local search was set to 10% of the total budget, while the termination tolerance parameter value was set to 10^{-12} .

The HMLSL method posses the same parameter settings as the MLSL algorithm. Additionally we apply 4D DE iterations to the reduced sample. The iterations number was selected after a small systematic study and provides a good balance between the two methods.

The population size for DE was set to 5D while the crossover and mutation rates to 0.5. Similar population size was also applied in [10]. The crossover strategy is the exponential one and the mutation operator combines the best member with other two randomly chosen individuals.

4. **RESULTS**

Results from experiments according to [4] on the benchmark functions given in [3, 6] are presented in Figures 1, 2 and 3 and in Tables 1 and 2. The expected running time (ERT), used in the figures and table, depends on a given target function value, $f_t = f_{opt} + \Delta f$, and is computed over all relevant trials as the number of function evaluations executed during each trial while the best function value did not reach $f_{\rm t}$, summed over all trials and divided by the number of trials that actually reached f_t [4, 11]. Statistical signifi**cance** is tested with the rank-sum test for a given target Δf_t $(10^{-8} \text{ as in Figure 1})$ using, for each trial, either the number of needed function evaluations to reach $\Delta f_{\rm t}$ (inverted and multiplied by -1), or, if the target was not reached, the best Δf -value achieved, measured only up to the smallest number of overall function evaluations for any unsuccessful trial under consideration.

4.1 CPU Timing Experiments

The three algorithms were run on the test function f_8 , and restarted until at least 30 seconds had passed. These experiments were carried out on a machine with Intel Dual-Core processor, 2.6 Ghz, with 2 GB RAM, on Windows 7 64bit in MATLAB R2011b 64bit. The average time per function evaluation in 2, 3, 5, 10, 20, 40 dimensions was about 14, 9.6, 6.7, 5.0, 2.9, 3.7×10^{-4} s for HMLSL, about 13, 8.9, 6.9, 5.2, 3.9, 3.7×10^{-4} s for MLSL, and about 2.1, 2.1, 2.1, 2.1, 2.2, 2.1×10^{-4} s for DE.

5. DISCUSSION

As a result of the hybridization the HMLS method is usually better than the MLSL algorithm in terms of the ERT needed to find the $\Delta f = 10^{-8}$. Moreover HMLSL is significantly faster than MLSL on the f_3 , f_4 , f_7 , f_{10} , f_{11} , f_{13} , f_{14} , f_{16} , f_{17} , and f_{18} functions (see Figure 1). Compared to the DE method, HMLSL is significantly faster on the f_1 , f_8 , f_9 , f_{21} , and f_{22} functions.

Considering the proportion of solved instances we can state that the new HMLSL method inherits the speed of the simple MLSL algorithm on the initial phase of the optimization, while the use of the DE method inside the MLSL provides a better performance in the final stage.

In 5-D (see Figure 2), the general aspect is that the HMLSL method is as fast as the MLSL algorithm in the initial stage (#FEs < 100*D*) of the optimization, while in the middle and final phases (#FEs > 100*D*) it is usually faster than the MLSL and DE methods. These properties can be nicely followed in the figure with all functions aggregated and on the multi-modal functions subgroup. On the weakly structured multi-modal functions the MLSL is slightly faster than HMLSL in the initial stage (200D<#FEs < 700*D*) of the optimization. After 700*D* evaluations the HMLSL method becomes the leader and up to the final budget solves around 78% of the problems.

As a result of the hybridization, the HMLSL method is significantly better then the MLSL on the separable, moderate and multi-modal function subgroups. This increase is caused by solving the f_3 , f_4 , f_{15} , f_{17} , f_{18} , and f_{19} functions, where MLSL was able to solve only the problems with loose target levels.

In the 20-D space, similar aspects can be observed as in 5-D (see Figure 3). Considering all functions aggregated for larger budgets than $10^4 D$, HMLSL is the best algorithm, solving almost 70% of the problems, followed by MLSL, and DE solving about 58%, and 45% of the problems, respectively. Significant improvements can be observed on the moderate functions subgroup where HMLSL solved 100% of the problems, followed by MLSL and DE (75% and 70%, respectively). This is due to the one solved instance of the f_7 function by HMLSL. The lowest percentage (about 35%) of the solved problems by HMLSL can be observed on the multi-modal functions subgroup. This is due to the difficulties of the MLSL and DE methods on these functions.

On the ill-conditioned and weakly structured functions the MLSL method is slightly faster in the middle stage of the optimization, while on the moderate and ill-conditioned function subgroups the HMLSL method (with MLSL) is even faster than the best algorithm from BBOB-2009 on the initial phase (D < #FEs < 200D) of the optimization.

6. CONCLUSIONS

We benchmarked the HMLSL algorithm, a hybrid version of the classic MLSL and DE methods. The new hybrid algorithm differs from MLSL in that it applies a few DE iterations in the global phase. The new algorithm was extensively compared with the MLSL and DE methods on the testbed of 24 noiseless functions in order to reveal the benefits of the new improvements.

The results show that the HMLSL outperforms the MLSL and DE methods. The new method has a larger success probability and is as fast as the MLSL method in the initial and middle phase while in the final stage of the optimization it is usually faster than the other two algorithms.

Further improvements by using adaptive DE remains to be investigated as a future work.

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Figure 1: Expected running time (ERT in number of *f*-evaluations) divided by dimension for target function value 10^{-8} as \log_{10} values versus dimension. Different symbols correspond to different algorithms given in the legend of f_1 and f_{24} . Light symbols give the maximum number of function evaluations from the longest trial divided by dimension. Horizontal lines give linear scaling, slanted dotted lines give quadratic scaling. Black stars indicate statistically better result compared to all other algorithms with p < 0.01 and Bonferroni correction number of dimensions (six). Legend: $\circ:MLSL$, $\bigtriangledown:DE$, $\star:HMLSL$



Figure 2: Bootstrapped empirical cumulative distribution of the number of objective function evaluations divided by dimension (FEvals/D) for 50 targets in $10^{[-8..2]}$ for all functions and subgroups in 5-D. The "best 2009" line corresponds to the best ERT observed during BBOB 2009 for each single target.



Figure 3: Bootstrapped empirical cumulative distribution of the number of objective function evaluations divided by dimension (FEvals/D) for 50 targets in $10^{[-8..2]}$ for all functions and subgroups in 20-D. The "best 2009" line corresponds to the best ERT observed during BBOB 2009 for each single target.

| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
|---|---|---|---|--|---|---|--|---|---|---|---|---|--|---|--|
| f1 | 11 | 12 | 12 | 12 | 12 | 12 | 15/15 | f13 | 132 | 195 | 250 | 1310 | 1752 | 2255 | 15/15 |
| MLSL | 0.71 (0.3) | 1.4(0.5) | 2.0(0) | 2.6(0.2) | 3.4(0.2) | 3.9(0.5) | 15/15 | MLSL | 0.74(0.1) | 20.76(0.1) | ↓ 4 0.80 (0.1)↓ | $_{4}$ 4.2(0.5) | 50(62) | ∞ 7e4 | 0/15 |
| DE | 4.9(3) | 20(7) | 39(5) | 79(7) | 120(9) | 157(8) | 15/15 | DE | 11(4) | 23(10) | 43(15) | 20(7) | 26(7) | 28(5)*3 | 15/15 |
| HMLSL | 0.71 (0.3) | 1.4(0.5) | 2.0(0) | 2.6(0.2) | 3.4(0.2) | 3.9 (0.5) | 15/15 | HMLSL | 0.74 (0.1) | 20.76(0.1) | 40.80(0.1)↓ | $_{4}$ 2.0 (3) | 21 (22) | 164(157) | 0/15 |
| $\Delta f_{\rm opt}$ | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| f2 | 83 | 87 | 88 | 90 | 92 | 94 | 15/15 | f14 | 10 | 41 | 58 | 139 | 251 | 476 | 15/15 |
| MLSL | 1.9(1) | 2.1(1) | 2.3(1) | 2.6(1) | 3.7(1) | 5.1(5) | 15/15 | MLSL | 0.68 (0.4) | 0.53(0.2)+2 | 0.64(0.2)12 | 0.67(0.2) | 0.72(0.1) | 793(909) | 0/15 |
| DE | 11(1) | 13(1) | 15(1) | 20(1) | 25(1) | 30(1) | 15/15 | DE | 2 2(2) | 6 2(3) | 11(3) | 16(7) | 36(12) | 46(9)* | 15/15 |
| HMLSL | 1.9 (1) | 2.1(1) | 2.3(1) | 2.6(1) | 3.9(1) | 5.5(7) | 15/15 | HMLSL | 0.68(0.4) | 0.53(0.2)12 | 0.64(0.2)12 | 0.67(0.2) | 0.72(0.1) | 72(24) | 15/15 |
| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | A £ | 1 | 1-0 | 1 - 1 | 1 - 9 | 1 | 1 - 7 | , 1.4 |
| f3 | 716 | 1622 | 1637 | 1646 | 1650 | 1654 | 15/15 | | 101 | 100 | 10900 | 10-3 | 16-3 | 1e-7 | #succ |
| MLSL | 5.6(5) | 279(315) | ~ | ~ | ∞ | ∞ 6e4 | 0/15 | 115 MICI | 511 | 9310 | 19369 | 20073 | 20769 | 21359 | 14/15 |
| DE | 1.2(0.4) | 1.7(0.3) | 1.9(0.3)* | ² 2.3(0.3)* | ² 2.5 (0.3)* | 2.8(0.4) | 15/15 | DE | 10(7) | 6.5(4) | 5 Q(5) | 7 9(7) | 7 7 (6) | ∞ 0e4 7 5(8) | 8/15 |
| HMLSL | 1.3(0.2) | 2.2(1) | 3.2(1.0) | 3.2(1) | 3.3(1) | 3.3(1) | 15/15 | HMLSI | 23(1)* | 5 5(6) | 10(11) | 10(10) | 10(11) | 10(10) | 6/15 |
| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | | 2.0(1) | 0.0(0) | 10(11) | 10(10) | 10(11) | 10(10) | 10/10 |
| f4 | 809 | 1633 | 1688 | 1817 | 1886 | 1903 | 15/15 | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | le-5 | 1e-7 | #succ |
| MLSL | 22(24) | ~ | ∞ | 80 | 80 | ∞ 6e4 | 0/15 | 116 | 120 | 612 | 2663 | 10449 | 11644 | 12095 | 15/15 |
| DE | 1.3(0.4) | 12(31)* | 165(208) | 154(193) | 149(186) | 147(184) | 4/15 | DE | 4.7(3) 9 9(2) | 22(28) | 199(199) | 80 | ~ | 00 9e4 | 0/15 |
| HMLSL | 1.5(0.7) | 13(31) | 93 (119) | 87(111) | 84(106) | 83(105) | 6/15 | HMLSL | 4.4(2) | 45(30) | 530(639) | ~ | ~ | ∞ 1e5 | 0/15 |
| Δf. | 161 | 1.0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | 1 / 1#81100 | | 1.1(2) | 40(00) | 000(000) | ~ | ~ - | | 10/10 |
| | 10 | 10 | 10 | 10 | 10 | 10 | # Succ | Δf_{opt} | lel | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| MLSL | 2 5(0) | 4 3(0) | 5 5(0) | 61(0) | 67(0) | 18(16) | 14/15 | f17 | 5.2 | 215 | 899 | 3669 | 6351 | 7934 | 15/15 |
| DE | 29(14) | 108(17) | 193(31) | 389(26) | 572(37) | 771(41) | 15/15 | MLSL | 24(35) | 125(137) | 3 / > 3 | *3/ | 3 | $\sim 1e_2$ | 0/15 |
| HMLSL | 2.5(0) | 4.3(0) | 5.5 (0) | 6.1(0) | 6.7(0) | 87(159) | 15/15 | DE | 5.4(5) | 2.6(1) | 2.3 (0.9) | 1.7 (0.6) | 3.1 (0.9) [^] | 3.2 (0.9) [~] | 14/15 |
| Δf i | 161 | 1e0 | 1e-1 | 10-3 | 1e-5 | 1e-7 | 1 / 1#81100 | HMLSL | 26(34) | 11(8) | 8.2(8) | 5.3(2) | 4.6(2) | 6.9(6) | 13/15 |
| fe | 1114 | 214 | 291 | 580 | 1028 | 1222 | 15/15 | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| MLSL | 1.2(0.6) | 1.1(0.4) | 1.2(0.5) | 0.85(0.3) | 0.73(0.2) | 0.71(0.2) | 15/15 | f18 | 103 | 378 | 3968 | 9280 | 10905 | 12469 | 15/15 |
| DE | 2.5(1) | 5.1(2) | 7.6(1) | 8.9(2) | 8.1(2) | 8.9(3) | 15/15 | MLSL | 20(36) | 1206(1334 |) ~~ | , °°° | , ∞ , ⊃ | $\infty 1e5$ | 0/15 |
| HMLSL | 1.2(0.6) | 1.1(0.4) | 1.2(0.5) | 0.85(0.3) | 0.73(0.2) | 0.71(0.2) | 15/15 | DE | 1.9(1.0)** | 4.9 (3) | ² 1.5 (0.8) | *3 2.3(0.6) | 4 4.1 (1)*2 | $5.3(4)^{\star}$ | 13/15 |
| | | . , | · , | () | . , | · / | | HMLSL | 10(8) | 10(7) | 5 1 (3) | 5 2(1) | 6 9 (2) | 14(19) | 5/15 |
| Λf. | 101 | 160 | 10-1 | 10-3 | 16-5 | 1 - 7 | H81100 | | 10(0) | 10(1) | 0.1(0) | 0.2(1) | 0.5(2) | 14(12) | 0/10 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ | 1e1 | 1e0 324 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | $\Delta f_{\rm opt}$ | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 14(12) 1e-7 | #succ |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL | 1e1 24 64(61) | 1e0 324 1097(1314 | 1e-1 1171 | 1e-3 1572 ∞ | 1e-5 1572 ∞ | 1e-7 1597 ∞ 5e4 | #succ 15/15 0/15 | $\frac{\Delta f_{\text{opt}}}{\mathbf{f19}}$ | 1e1 1 | 1e0 | 1e-1 242 | 1e-3 1.2e5 | 1e-5 1.2e5 | 14(12) 1e-7 1.2e5 | #succ 15/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE | 1e1 24 64(61) 9.0(9) | 1e0 324 1097(1314 2.8 (1) | 1e-1 1171 ∞ 1.7(1) | 1e-3 1572 ∞ 2.8 (0.8) | 1e-5 1572 ∞ 2.8(0.8) | 1e-7 1597 $\infty 5e4$ 3.0(1) | #succ 15/15 0/15 15/15 | $\frac{\Delta f_{\rm opt}}{\mathbf{f19}}$ MLSL | 1e1 1 1(0) | 1e0 1 1(0) | 1e-1 242 0.17(0 | 1e-3 1.2e5 .0)↓₽∞ | 1.2e5 ∞ | 14(12) 1e-7 1.2e5 ∞ 1e5 | #succ 15/15 0/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL | 1e1 24 64(61) 9.0 (9) 16(3) | 1e0 324 1097(1314 2.8 (1) 3.8(2) | 1e-1 1171 ∞ 1.7(1) 8.7(1) | | 1e-5 1572 ∞ 2.8(0.8) 8.5(2) | $ 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) $ | #succ 15/15 0/15 15/15 14/15 | $\frac{\Delta f_{\rm opt}}{\mathbf{f19}}$ MLSL DE | 1e1 1 1(0) 34(28) | 1e0 1 1(0) 3306(1883) | 1e-1 242 0.17(0 1087(1102 | 0.2(1) 1e-3 1.2e5 .0)↓¶∞) ∞ | 1e-5 1.2e5 ∞ ∞ | 14(12) 1e-7 1.2e5 $\infty 1e5$ $\infty 1e5$ | #succ 15/15 0/15 0/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL Δf | 1e1 24 64(61) 9.0 (9) 16(3) | 1e0 324 1097(1314 2.8 (1) 3.8(2) 1e0 | | 1e-3 ∞ 2.8(0.8) 8.5(2) 1e-3 | 1e-5 | $ 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 $ | #succ 15/15 0/15 15/15 14/15 #succ | $\frac{\Delta f_{\rm opt}}{\mathbf{f19}}$ MLSL DE HMLSL | 1e1 1 1(0) 34(28) 1(0) | 1e0 1 1(0) 3306(1883) 1(0) | 1e-1 242 0.17(0 1087(1102 0.17(0 | 1e-3 1.2e5 .0)↓₽°) ∞ .0)↓ 1 3(14) | 1e-5 1.2e5 ∞ 12(13) | $14(12) \\ 1e-7 \\ 1.2e5 \\ \infty 1e5 \\ 0 1e5 \\ 12(14)$ | #succ 15/15 0/15 0/15 1/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ | 1e1 24 64(61) 9.0 (9) 16(3) 1e1 72 | 1e0 324 1097(1314 2.8 (1) 3.8(2) 1e0 272 | | 1e-3 | 1e-5 ∞ 2.8(0.8) 8.5(2) 1e-5 410 | $ 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 $ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 | $\frac{\Delta f_{\text{opt}}}{\text{f19}}$ MLSL DE HMLSL Δf_{opt} | 1e1 1 1(0) 34(28) 1(0) 1e1 | 1e0 1 1(0) 3306(1883) 1(0) 1e0 | 1e-1 242 0.17(0 1087(1102 0.17(0 1e-1 | 1e-3 1.2e5 $0.0_{\downarrow}4^{\infty}$ $0.0_{\downarrow}13(14)$ 1e-3 | 1e-5 1.2e5 ∞ 12(13) 1e-5 | $14(12)$ 1e-7 1.2e5 ∞ 1e5 ∞ 1e5 12(14) 1e-7 | #succ 15/15 0/15 0/15 1/15 #succ |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ MLSL | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0,3) | $ \begin{array}{r} 1e0 \\ 324 \\ 1097(1314 \\ 2.8(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ \end{array} $ | | 1e-3 | $ \begin{array}{r} 1e-5 \\ 1572 \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ 1e-5 \\ 410 \\ 0.97(0.6) \end{array} $ | $1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 | $\frac{\Delta f_{\text{opt}}}{\text{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{\text{opt}}}{\text{f20}}$ | 1e1 1 1(0) 34(28) 1(0) 1e1 16 | 1e0 1 1(0) 3306(1883) 1(0) 1e0 851 | 1e-1 242 0.17(0 1087(1102 0.17(0 1e-1 38111 | 1e-3 1.2e5 $0.0)\downarrow \Phi^{\infty}$ $0.0)\downarrow 13(14)$ 1e-3 54470 | 1e-5 1.2e5 ∞ 12(13) 1e-5 54861 | $ \begin{array}{r} 1e_{4}(12) \\ 1e_{-7} \\ 1.2e5 \\ \infty 1e5 \\ 12(14) \\ 1e_{-7} \\ 55313 \\ \end{array} $ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) | 1e0 324 1097(1314 2.8 (1) 3.8(2) 1e0 273 1.0 (1.0) 7.6(2) | | $ \begin{array}{r} $ | $ \begin{array}{r} 1e-5 \\ 1572 \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ 1e-5 \\ 410 \\ 0.97(0.6) \\ 36(6) \end{array} $ | $1e-7 1597 \infty 5e4 3.0(1) 8.8(2) 1e-7 422 0.96(0.6) 46(6)$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ MLSL | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34(28) \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$ | 10(1) $10(1)$ 1 $1(0)$ $306(1883)$ $1(0)$ $1e0$ 851 $7.2(10)$ | 1e-1 242 0.17(0 1087(1102 0.17(0 1e-1 38111 21(25) | 1e-3 1.2e5 $.0)\downarrow \Phi^{\circ}$ $.0)\downarrow 13(14)$ 1e-3 54470 15(18) | $ \begin{array}{r} 1e-5 \\ 1.2e5 \\ \infty \\ 12(13) \\ 1e-5 \\ \overline{54861} \\ 15(16) \end{array} $ | $1=(12)$ 1e-7 1.2e5 ∞ 1e5 $12(14)$ 1e-7 55313 15(16) | #succ 15/15 0/15 0/15 1/15 #succ 14/15 1/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL DE HMLSL | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) 1.0(0.3) | 1e0 324 1097(1314 2.8 (1) 3.8(2) 1e0 273 1.0 (1.0) 7.6(2) 1.3(2) | $\begin{array}{r} 1e-1 \\ \hline 1171 \\) \infty \\ 1.7(1) \\ 8.7(1) \\ \hline 1e-1 \\ \hline 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \end{array}$ | $\begin{array}{r} 1e-3 \\ \hline 1572 \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ \hline 1e-3 \\ 391 \\ 0.95(0.7) \\ 26(4) \\ 1.1(1) \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ MLSL DE | $100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 101 \\ 101 \\ 100 \\ 1.4(0) \\ 7.7(4) \\ 100 $ | 10(1) 1e0 1 1(0) 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) | 1e-1 242 0.17(0 1087(1102 0.17(0 1242 0.17(0 1242 0.17(0 1242 0.17(0 1242 0.17(0 1242 0.17(0 1242 0.17(0 1242 2.4(4) | $\begin{array}{r} 1e-3 \\ \hline 1.2e5 \\ 0.0)\downarrow \mathbf{\hat{r}} \\ 0.0)\downarrow \mathbf{\hat{l}} 3(14) \\ 1e-3 \\ 54470 \\ 15(18) \\ 1.7(3) \end{array}$ | $\begin{array}{c} 1.5(2) \\ 1e-5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \end{array}$ | $\begin{array}{c} 1 = (12) \\ 1 = -7 \\ \hline 1.2e5 \\ \infty \ 1e5 \\ 12(14) \\ 1e-7 \\ 55313 \\ 15(16) \\ 1.7(2) \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 1/15 8/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ MLSL DE HMLSL DE HMLSL | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) 1.0(0.3) | $\begin{array}{c} 1e0\\ 324\\ 1097(1314\\ \textbf{2.8}(1)\\ 3.8(2)\\ 1e0\\ \hline 273\\ \textbf{1.0}(1.0)\\ 7.6(2)\\ 1.3(2)\\ 1e0\\ \end{array}$ | 1e-1 1171) ∞ 1.7(1) 8.7(1) 1e-1 336 0.99(0.8) 17(3) 1.2(2) 1e-1 | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ MLSL DE HMLSL DE | $\begin{array}{c} 1e1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34(28) \\ 1(0) \\ 1e1 \\ 16 \\ 1.4(0) \\ 7.7(4) \\ 1.4(0) \end{array}$ | 1e0 1 1(0) 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) | $\begin{array}{r} 1 \\ \hline 1 \\ 242 \\ 0.17(0 \\ 1087(1102 \\ 0.17(0 \\ 1e-1 \\ 38111 \\ 21(25) \\ 2.4(4) \\ 4.1(5) \end{array}$ | $\begin{array}{c} 1e-3 \\ \hline 1.2e5 \\ .0)\downarrow \P^{\infty} \\) & \infty \\ .0)\downarrow 13(14) \\ 1e-3 \\ 54470 \\ 15(18) \\ 1.7(3) \\ 2.9(4) \end{array}$ | $\begin{array}{c} 1.5(2) \\ \hline 1e-5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \end{array}$ | $\begin{array}{c} 1 = (12) \\ 1 = -7 \\ \hline 1.2e5 \\ \infty \ fe5 \\ \infty \ fe5 \\ 12(14) \\ 1e-7 \\ \hline 55313 \\ 15(16) \\ 1.7(2) \\ 2.8(4) \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 1/15 8/15 6/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f9}}$ | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) 1.0(0.3) 1e1 35 | 1e0 324 1097(1314 2.8 (1) 3.8(2) 1e0 273 1.0 (1.0) 7.6(2) 1.3(2) 1e0 127 | $\begin{array}{c} 1e-1 \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ \hline 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \end{array}$ | $\begin{array}{c} 1e-3 \\ 1572 \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ 1e-3 \\ 391 \\ 0.95(0.7) \\ 26(4) \\ 1.1(1) \\ 1e-3 \\ 300 \\ \end{array}$ | $1e-5$ 1572 ∞ 2.8 (0.8) 8.5(2) 1e-5 410 0.97 (0.6) 36(6) 1.1(1) 1e-5 335 | $\begin{array}{c} 1e-7 \\ 1597 \\ \infty \ 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 360 \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | $\begin{array}{c} 16(1)\\ 1\\ 1\\ 1\\ 1\\ 0\\ 3306(1883)\\ 1(0)\\ 1e0\\ \hline 851\\ 7.2(10)\\ 2.3(2)\\ 2.3(1)\\ 1e0\\ \end{array}$ | 1e-1 242 0.17(0 1087(1102 0.17(0 1e-1 38111 21(25) 2.4(4) 4.1(5) 1e-1 | $\begin{array}{c} 1e-3 \\ \hline 1.2e5 \\ .0)\downarrow \mathfrak{P}^{\circ} \\) & \infty \\ .0)\downarrow \mathfrak{I}^{\mathfrak{g}}(14) \\ 1e-3 \\ 54470 \\ 15(18) \\ 1.7(3) \\ 2.9(4) \\ 1e-3 \end{array}$ | $\begin{array}{c} 1.6(2)\\ 1e-5\\ \hline 1.2e5\\ \infty\\ \infty\\ 12(13)\\ 1e-5\\ \hline 54861\\ 15(16)\\ 1.7(3)\\ 2.8(4)\\ 1e-5\\ \end{array}$ | $\begin{array}{c} 1e(12) \\ 1e-7 \\ \hline 1.2e5 \\ \infty \ le5 \\ \infty \ le5 \\ 12(14) \\ 1e-7 \\ \hline 55313 \\ 15(16) \\ 1.7(2) \\ 2.8(4) \\ 1e-7 \\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 1/15 8/15 6/15 #succ |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f9}}$ MLSL | $\begin{array}{c} 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ \end{array}$ | 1e0 324 1097(1314 2.8(1) 3.8(2) 1e0 273 1.0(1.0) 7.6(2) 1.3(2) 1e0 127 0.64(0,1) | $\begin{array}{c} 1e-1 \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ \\ 1e-1 \\ 214 \\ \\ 0.61(0.1) \end{array}$ | 1e-3 1572 2.8(0.8) 8.5(2) 1e-3 391 0.95(0.7) 26(4) 1.1(1) 1e-3 300 4.0.57(0.0) | $\begin{array}{c} 1e-5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e-5\\ 335\\ 335\\ 40.56(0.0)\\ \end{array}$ | $\begin{array}{c} 1e-7\\ 1597\\ \infty\ 5e4\\ \textbf{3.0}(1)\\ 8.8(2)\\ 1e-7\\ 422\\ \textbf{0.96}(0.6)\\ 46(6)\\ 1.1(1)\\ 1e-7\\ 369\\ \textbf{40}, \textbf{54}(0.0) \\ \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34(28) \\ 1 \\ 0 \\ 1e1 \\ 16 \\ 1.4 \\ 0 \\ 7.7 \\ (4) \\ 1.4 \\ 0 \\ 1e1 \\ 41 \end{array}$ | 1e0 1 1(0) 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) 1e0 1157 | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 2 \\ 2 \\ 2 \\ 0.17(0 \\ 1087(1102 \\ 0.17(0 \\ 10e^{-1} \\ 38111 \\ 21(25) \\ 2.4(4) \\ 4.1(5) \\ 1e^{-1} \\ 1674 \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ 1.2e5\\ .0)_{4} \pounds \\ \infty\\ .0)_{4} 1 1 1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 $ | 1e-5 1.2e5 ∞ 12(13) 1e-5 54861 15(16) 1.7(3) 2.8(4) 1e-5 1729 | $\begin{array}{c} 1e-7 \\ 1.2e5 \\ \infty \ Ie5 \\ 12(14) \\ 1e-7 \\ 55313 \\ 15(16) \\ 1.7(2) \\ 2.8(4) \\ 1e-7 \\ 1757 \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 8/15 6/15 #succ 14/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL DE | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) 1.0(0.3) 1e1 35 0.94(0) 24(8) | $\begin{array}{c} 1 e0 \\ 324 \\ 1097(1314 \\ \textbf{2.8}(1) \\ 3.8(2) \\ 1e0 \\ 100 \\ 1.0 \\ 1$ | $\begin{array}{c c} 1e-1 \\\hline 1171 \\) \infty \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\\hline 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\\hline 1e-1 \\\hline 214 \\\hline 214 \\ 4 \\ 0.61(0.1) \\\hline 30(6) \\\hline \end{array}$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ \hline 300\\ 44\\ 0.57(0.0)\\ 38(10)\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \infty \ 5ed \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ \hline 369 \\ 40.54(0.0)_4 \\ 57(16) \\ 57(16) \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ $\frac{\Delta f_{opt}}{\mathbf{f19}}$ $\frac{\Delta f_{opt}}{\mathbf{f20}}$ $\frac{\Delta f_{opt}}{\mathbf{f20}}$ $\frac{\Delta f_{opt}}{\mathbf{f21}}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 e(0) \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | $\begin{array}{c} 3.1(5)\\ 1e-1\\ 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 187(1102\\ 0.17(0\\ 187(1102\\ 0.17(0\\ 187(1102\\ 0.17(0\\ 187(10)\\ 187($ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)\downarrow 4^{\infty}\\) & \infty\\ 0.0)\downarrow 43(14)\\ 1e-3\\ \hline 54470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ \hline 1705\\ 1.3(2)\\ \end{array}$ | $\begin{array}{c} 1.2 \times 1 \\ 1.2 \times 5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \end{array}$ | $\begin{array}{c} 14(12) \\ 1e-7 \\ 1.2e5 \\ \infty \ le5 \\ \infty \ le5 \\ 12(14) \\ 1e-7 \\ 55313 \\ 15(16) \\ 1.7(2) \\ 2.8(4) \\ 1e-7 \\ 1757 \\ 1.4(2) \end{array}$ | #succ 15/15 0/15 0/15 1/15 1/15 8/15 6/15 #succ 14/15 15/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL DE HMLSL DE HMLSL | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 8.0(2) 1.0(0.3) 1e1 35 0.94(0) 24(8) 0.94(0) | $\begin{array}{c} 1 e 0 \\ 324 \\ 1097(1314 \\ \textbf{2.8}(1) \\ 3.8(2) \\ 1e0 \\ 773 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ \textbf{0.64}(0.1) \\ 24(9) \\ \textbf{0.64}(0.1) \end{array}$ | $\begin{array}{c} 1e{-1} \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e{-1} \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e{-1} \\ 214 \\ 214 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \end{array}$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 38(10)\\ 14\\ 0.57(0.0)\\ 38(10)\\ 14\\ 0.57(0.0)\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ \hline 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 140.56(0.0)\\ 49(14)\\ 40.56(0.0)\\ 140.56(0.0)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 369 \\ 369 \\ 369 \\ 57(16) \\ 4.054(0.0) \\ 14.054 \\ 0.54(0.0) \\ 14.054 \\ 0.54 \\ 0.01 \\ 14.054 \\ 0.54 \\ 0.01 \\ 14.054 \\ 0.54 \\ 0.01 \\ 14.054 \\ 0.54 \\ 0.01 \\ 0.54 \\ 0.01 \\ 0.54 \\ 0.01 \\ 0.54 \\ 0.01 \\ 0.54 \\ 0.55 $ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{\rm opt}}{\mathbf{f19}}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\$ | $\begin{array}{c} 3.1(6)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ \hline 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ \hline 1e-1\\ \hline 1674\\ 1.3(2)\\ 23(31)\\ \end{array}$ | $\begin{array}{c} 5.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0) \downarrow \Phi^{\circ} \\) & \infty\\ 0) \downarrow 13(14)\\ 1e-3\\ 54470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ \end{array}$ | $\begin{array}{c} 1.2e5\\ 1.2e5\\ \infty\\ \infty\\ 12(13)\\ 1e{-}5\\ 54861\\ 15(16)\\ 1.7(3)\\ 2.8(4)\\ 1e{-}5\\ 1729\\ 1.4(2)\\ 24(31)\\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \propto le5\\ \propto le5\\ 12(14)\\ \hline 1e-7\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 1/15 8/15 6/15 #succ 14/15 15/15 11/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ $\frac{\Delta f_{\text{opt}}}{\mathbf{f8}}$ $\frac{\Delta f_{\text{opt}}}{\mathbf{f9}}$ $\frac{\Delta f_{\text{opt}}}{\mathbf{f9}}$ $MLSL$ DE $HMLSL$ Δf | 1e1 24 64(61) 9.0(9) 16(3) 1e1 73 1.0(0.3) 1e1 35 0.94(0) 24(8) 0.94(0) 1e1 | $\begin{array}{c} 1 e0 \\ 324 \\ 1097(1314 \\ \textbf{2.8}(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ \textbf{1.0}(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ \textbf{0.64}(0.1) \\ 24(9) \\ \textbf{0.64}(0.1) \\ 1e0 \end{array}$ | $\begin{array}{c} 1e-1 \\ 1171 \\) \infty \\ 1.7(1) \\ 8.7(1) \\ 1e-1 \\ \hline 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 4 \\ 0.61(0.1) \\ 4 \\ 0.61(0.1) \\ 1e \\ $ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 14\\ 0.57(0.0)\\ 38(10)\\ 1-2\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 14\\ 0.56(0.0)\\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 14 \\ 0.54(0.0)_4 \\ 57(16) \\ 4 \\ 0.54(0.0)_4 \\ 1e-7 \end{array}$ | $\begin{array}{c} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 15/15 \\ 15/15 \\ 14/15 \\ \# {\rm succ} \\ 15/15 $ | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | 160(1) 1 10) 3306(1883) 1(0) 851 7.2(10) 2.3(2) 2.3(1) 1e0 1157 0.74(0.7) 1.9(2) 0.88(0.7) | $\begin{array}{c} 3.1(5)\\ 1e-1\\ 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \Re^{(0)}\\) \infty\\ 0.0)_{4} 13(14)\\ 1e-3\\ 54470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1.705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ \end{array}$ | $\begin{array}{c} 1.2 \times 5 \\ 1.2 \times 5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1.729 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ \end{array}$ | #succ 15/15 0/15 1/15 #succ 14/15 1/15 8/15 6/15 #succ 14/15 15/15 15/15 15/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL HMLSL DE HMLSL HML | $\begin{array}{c} 1e1\\ 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 1e1\\ 240\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{red} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ 0.64(0.1) \\ 1e0 \\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 4 \\ 0.61(0.1) \\ 30(6) \\ 30(6) \\ 1e-1 \\ \frac{1}{5\pi 4} \end{array}$ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 44\\ 0.57(0.0)\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ exc\\ exc\\ exc\\ exc\\ exc\\ exc\\ exc\\ exc$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 49(14)\\ 1e{-}5\\ 920\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 57(16) \\ 57(16) \\ 57(40.0) \\ 1e-7 \\ 9e0 \end{array}$ | #succ 15/15 0/15 15/ | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34 \\ 28 \\ 1 \\ 0 \\ 16 \\ 1.4 \\ 0 \\ 7.7 \\ (4) \\ 1.4 \\ 0 \\ 1.4 \\ 0 \\ 2.8 \\ 5 \\ 2.5 \\ (2) \\ 2.3 \\ (3) \\ 1 \\ 1e1 \\ \end{array}$ | 1e0 1 10) 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) 1e0 157 0.74(0.7) 1.9(2) 0.88(0.7) 1e0 | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \sc sc s$ | $\begin{array}{c} 1.2e5\\ 1.2e5\\ \infty\\ \infty\\ 12(13)\\ 1e-5\\ 54861\\ 15(16)\\ 1.7(3)\\ 2.8(4)\\ 1e-5\\ 1729\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-5\\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ \end{array}$ | #succ 15/15 0/15 1/15 #succ 14/15 1/15 8/15 6/15 #succ 14/15 15/15 15/15 15/15 15/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL MLSL DE HMLSL DE HMLSL H | $\begin{array}{c} 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 349\\ 0.92(0,1)\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{red} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ \hline 500 \\ 0.22(0,1) \\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 1.4 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e-1 \\ 574 \\ 0.62(0.1) \\ 1e-1 \\ 574 \\ 0.62(0.1) \\ 1e-1 \\ 574 \\ 0.62(0.1) \\ 1e-1 \\$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 14 \ 0.57(0.0)\\ 16-3\\ 3(0)\\ 14 \ 0.57(0.0)\\ 1e-3\\ 626\\ 0 \ 60(0.2)\\ \end{array}$ | $\begin{array}{c} 1e-5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e-5\\ 335\\ 140.56(0.0)\\ 49(14)\\ 40.56(0.0)\\ 1e-5\\ 829\\ 1e-5\\ $ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 1e-7 \\ 880 \\ 1e-7 \\ 1e-7 \\ 880 \\ 1e-7 \\ 1e-7 \\ 880 \\ 1e-7 \\$ | #succ 15/15 0/15 15/ | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f19}$ $MLSL$ DE $HMLSL$ DE $HMLSL$ DE $HMLSL$ DE $HMLSL$ DE $HMLSL$ DE LSL DE $MLSL$ MLS | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | 1e0 1 1(0) 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) 1e0 1157 0.74(0.7) 1.9(2) 0.88(0.7) 1e0 386 | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 12(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ \hline \end{array}$ | $\begin{array}{c} 1.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0)_{1} \mbox{\mbox{\boldmath${\Phi}$}}\\) \mbox{\mbox{\mbox{\boldmath${\Phi}$}}}\\ 1.2e5\\ 0)_{1} \mbox{\mbox{\mbox{\boldmath${\Phi}$}}}\\ 1.2e5\\ 1.2e$ | $\begin{array}{c} 1.2 \times 5 \\ 1.2 \times 5 \\ \infty \\ \infty \\ 12(13) \\ 1e \cdot 5 \\ 54861 \\ 1.5(16) \\ 1.7(3) \\ 2.8(4) \\ 1e \cdot 5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \\ 1e \cdot 5 \\ 1040 \\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ \infty\ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ 1068\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 15/15 15/15 15/15 15/15 14/15 |
| $\frac{\Delta f_{\text{opt}}}{\mathbf{f7}}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1e1\\ 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 8.0(2)\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 349\\ 0.28(0.1)\\ 92(0)\\ \end{array}$ | $\begin{array}{c} 1 e 0 \\ \hline 324 \\ 1097(1314 \\ {\color{red} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ \hline 500 \\ 500 \\ 14 \\ 0.23(0.1) \\ 26(6) \\ \end{array}$ | $\begin{array}{c} 1e-1 \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\ \hline 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ \hline 214 \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 30(6) \\ 1e-1 \\ 574 \\ 574 \\ 0.22(0.1) \\ 30(6) \\ 30(6) \\ 1e-1 \\ 574 \\ 0.22(0.1) \\ 30(6) \\ 30(6) \\ 1e-1 \\ 1e-1 \\ 574 \\ 1e-1 \\ 1e-$ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ \overline{300}\\ 1e-3\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ 626\\ 4\\ 0.60(0.2)\\ 92(5)\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 57(16) \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 1e-7 \\ 880 \\ 129(176) \\ 57(6) \\ 129(176) \\ 57(6) \\ 129(176) \\ 57(6) \\ 129(176) \\ 57(6) \\ 129(176) \\$ | #succ 15/15 0/15 15/15 14/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f22}$ $\frac{\Delta f_{opt}}{f22}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 + 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 3306(1883) \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 2 \\ 3 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$ | $\begin{array}{c} 1.1(5)\\ \hline 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ \hline 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ \hline 1e-1\\ 938\\ 1.4(1)\\ \end{array}$ | $\begin{array}{c} 5.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \mbox{\boldmath${\sc red}$} \\ 10,0)_{4} \mbox{\boldmath${\sc red}$} \mbox{\boldmath${\sc red}$} \\ 10,0)_{4} \mbox{\boldmath${\sc red}$} \mbox{\boldmath${\sc red}$} \\ 10,0)_{4} \mbox{\boldmath${\sc red}$} \mb$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2e5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \\ 1e-5 \\ 1040 \\ 1.4(1) \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ 1068\\ 1.5(1)\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 1/15 8/15 6/15 #succ 14/15 15/15 15/15 14/15 |
| $\frac{\Delta f_{\rm opt}}{f7}$ MLSL DE HMLSL $\Delta f_{\rm opt}$ HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 8.0(2)\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 349\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 0.28(0$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{black} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ {\color{black} 0.64(0.1)} \\ 24(9) \\ {\color{black} 0.64(0.1)} \\ 1e0 \\ 500 \\ 100 $ | $\begin{array}{c} 1e{-1} \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e{-1} \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e{-1} \\ 214 \\ 4 \\ 0.61(0.1) \\ 30(6) \\ 4 \\ 0.61(0.1) \\ 1e{-1} \\ 574 \\ 574 \\ 4 \\ 0.22(0.1)_2 \\ 29(6) \\ 4 \\ 0.22(0.1)_2 \\ 29(6) \\ 4 \\ 0.22(0.1)_2 \\ 29(1) \\ 20(1) $ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 44\\ 0.57(0.0)\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ 626\\ 42(5)\\ 42(5)\\ 40.60(0.2)\\ 42(5)\\ 40.60(0.2)\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14.0.56(0.0)\\ 49(14)\\ 49(14)\\ 16(.5)\\ 16(15)\\ 16(15)\\ 44(4)\\ 18(37)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 57(16) \\ 57(16) \\ 57(40.0) \downarrow \\ 1e-7 \\ \overline{880} \\ 129(176) \\ 52(6) \\ 129(176) \\ 52(6) \\ 104(114) \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 #succ 15/15 15/15 15/15 #succ 15/15 15/15 8/15 | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f10}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f22}$ $MLSL$ DE $MLSL$ DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34 \\ 28 \\ 1 \\ 0 \\ 16 \\ 1.4 \\ 0 \\ 7.7 \\ (4) \\ 1.4 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $ | 160 1 100 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) 1e0 157 0.74(0.7) 1.9(2) 0.88(0.7) 1e0 386 1.8(3) 69(132) | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \hline 938\\ 1.4(1)\\ 96(108)\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \Re^{\circ}\\) & \infty\\ 0.0)_{4} 13(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ \hline 1008\\ 1.3(1)\\ 92(101)\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2e5 \\ \infty \\ 12(13) \\ 1e-5 \\ 554861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \\ 1e-5 \\ \hline 1040 \\ 1.4(1) \\ 91(143) \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ \hline 1068\\ 1.5(1)\\ 91(95)\\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 1/15 8/15 1/15 8/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 8/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL DE | $\begin{array}{c} 1 e1 \\ 1 e1 \\ 24 \\ 64(61) \\ 9.0(9) \\ 16(3) \\ 16(3) \\ 1e1 \\ 73 \\ 1.0(0.3) \\ 8.0(2) \\ 1.0(0.3) \\ 1e1 \\ 35 \\ 0.94(0) \\ 24(8) \\ 0.94(0) \\ 1e1 \\ 349 \\ 0.28(0.1) \\ 23(9) \\ 0.28(0.1) \\ 0.16(0.1) \\ 0$ | $\begin{array}{c} 1 e0 \\ \hline 1 e0 \\ 324 \\ 1097(1314 \\ 2.8(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ \hline 500 \\ 500 \\ 1e0 \\ 1e0 \\ 500 \\ 1e0 $ | $\begin{array}{c} 1e-1 \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 4.0.61(0.1) \\ 30(6) \\ 30(6) \\ 1e-1 \\ 574 \\ 574 \\ 574 \\ 29(6) \\ 29(6) \\ 4.0.22(0.1) \\ 4.$ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 1.1(1)\\ 1e-3\\ 300\\ 40.57(0.0)\\ 38(10)\\ 14\ 0.57(0.0)\\ 38(10)\\ 1e-3\\ 626\\ 626\\ 40.60(0.2)\\ 42(5)\\ 40.60(0.2)\\ 1e-3\\ 3ex\\ 3ex\\ 40.60(0.2)\\ 1ex\\ 3ex\\ 3ex\\ 3ex\\ 3ex\\ 3ex\\ 3ex\\ 3ex\\ 3$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 49(14)\\ 40.56(0.0)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ \cdot\\ \cdot\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e_4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 1.1(1) \\ 1e-7 \\ 369 \\ 1.1(1) \\ 1e-7 \\ 880 \\ 129(176) \\ 52(6) \\ 129(176) \\ 52(6) \\ 104(114) \\ 4.7 \\ 1.$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 3/15 15/15 | $ \frac{\Delta f_{opt}}{f19} \\ \frac{\Delta f_{opt}}{f19} \\ \text{MLSL} \\ DE \\ \text{HMLSL} \\ DE \\ \text{HMLSL} \\ DE \\ \text{HMLSL} \\ DE \\ \text{HMLSL} \\ \frac{\Delta f_{opt}}{f21} \\ \\ \frac{\Delta f_{opt}}{f22} \\ \\ \text{MLSL} \\ DE \\ \text{HMLSL} \\ \ DE \\ \ DE \\ \ HMLSL \\ \ DE \\ \ DE \\ \ HMLSL \\ \ DE \\ \ DE$ | $\begin{array}{c} 1 \ e1 \\ 1 \ 1 \\ 1 \ 0 \\ 34 \ (28) \\ 1 \ (0) \\ 1e1 \\ 16 \\ 1.4 \ (0) \\ 1e1 \\ 1.4 \ (0) \\ 1e1 \\ 2.8 \ (5) \\ 2.5 \ (2) \\ 2.3 \ (3) \\ 1e1 \\ 71 \\ 2.7 \ (3) \\ 3.5 \ (2) \\ 3.6 \ (3) \end{array}$ | 1e0 1 100 3306(1883) 1(0) 1e0 851 7.2(10) 2.3(2) 2.3(1) 1157 0.74(0.7) 1.9(2) 0.88(0.7) 1e0 386 1.8(3) 69(132) 2.1(2) | $\begin{array}{c} 1.1(0)\\ 1.1(1)\\ 1.1(1)\\ 2.1(1)\\ 2.1(1)\\ 0.17(0\\ 1.087(1102\\ 0.17(0\\ 1.087(1102\\ 0.17(0\\ 1.081(10)\\ 1.01(10)\\ $ | $\begin{array}{c} 0.12(1)\\ 1e-3\\ \hline 1.2e5\\ 0) \downarrow {\bf g}^{\infty}\\) \\ \infty\\ 0) \downarrow {\bf j}^{3}(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1.1(0.6)\\ 1e-3\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2 \\ e5 \\ \infty \\ 12 \\ (13) \\ 15 \\ 15 \\ (16) \\ 1.7 \\ (3) \\ 2.8 \\ (4) \\ 1e-5 \\ 1729 \\ 1.4 \\ (2) \\ 24 \\ (31) \\ 1.1 \\ (0.6) \\ 1e-5 \\ 1040 \\ 1.4 \\ (1) \\ 91 \\ (143) \\ 1.4 \\ (0.7) \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ leb\\ 12(14)\\ 1e-7\\ \hline 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ \hline 1757\\ 1.4(2)\\ 24(31)\\ 1.4(0.6)\\ 1e-7\\ 1068\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ \end{array}$ | #succ 14/15 1/15 1/15 1/15 1/15 1/15 1/15 1/1 |
| $\frac{\Delta f_{\rm opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f8}$ MLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f9}$ MLSL DE HMLSL $\Delta f_{\rm opt}$ | $\begin{array}{c} 1e1\\ 1e1\\ 24\\ 664(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 8.0(2)\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 24(8)\\ 0.94(0)\\ 1e1\\ 23(9)\\ 0.28(0.1)\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{black} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ {\color{black} 0.64(0.1)} \\ 24(9) \\ {\color{black} 0.64(0.1)} \\ 1e0 \\ \hline 500 \\ 26(6) \\ 14 \\ {\color{black} 0.23(0.1)} \\ 26(6) \\ 14 \\ {\color{black} 0.23(0.1)} \\ 1e0 \\ \hline \end{array}$ | $\begin{array}{c} 1e{-1} \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e{-1} \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e{-1} \\ \hline 214 \\ 14 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e{-1} \\ 574 \\ 29(6) \\ 29(0.1) \\ 29(0.1) \\ 1e{-1} \\ 1e{-1} \\ \hline 574 \\ 29(0.1) \\ 1e{-1} \\ 1e{-1} \\ \hline 574 \\ 1e{-1} $ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ \hline 300\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ \hline 626\\ 4\\ 0.60(0.2)\\ 42(5)\\ 4\\ 0.60(0.2)\\ 1e-3\\ \hline \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ \hline 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ \hline 335\\ 335\\ 40.56(0.0)\\ 49(14)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e{-}5\\ \hline 5\\ 50\\ 18(37)\\ 1e{-}5\\ \hline 5\\ 50\\ 18(37)\\ 1e{-}5\\ \hline 5\\ 50\\ 18(37)\\ 1e{-}5\\ 18(37)\\ 1$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ \overline{369} \\ 57(16) \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 1e-7 \\ 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 3/15 15/15 3/15 15/15 8/15 8/15 | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f22}$ $\frac{\Delta f_{opt}}{MLSL}$ $\frac{\Delta f_{opt}}{DE}$ $\frac{\Delta f_{opt}}{dt}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34 \\ 28 \\ 1 \\ 0 \\ 16 \\ 1.4 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $ | $\begin{array}{c} 1 e 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 3 \\ 3 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ \hline 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ 1.4(1)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ \end{array}$ | $\begin{array}{c} 5.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} f^{ec} \\) & \infty\\ 0.0)_{4} J^{3}(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ \hline 1705\\ 1.3(2)\\ 24(32)\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ \hline 1008\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2e5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \\ 1e-5 \\ 1040 \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e-5 \\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ \infty\ le5\\ 12(14)\\ \hline 1e-7\\ 155313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ \hline 1e-7\\ 1068\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 1/15 1/15 1/15 1/15 1/15 1/15 1/15 1/15 #succ 14/15 15/15 #succ 14/15 15/15 #succ 14/15 15/15 8/15 15/15 8/15 14/15 14/15 |
| $\frac{\Delta f_{\text{opt}}}{f7}$ MLSL DE MLSL $\frac{\Delta f_{\text{opt}}}{f8}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL MLSL DE HMLSL DE HMLSL MLSL MLSL DE HMLSL MLSL DE HMLSL MLSL MLSL MLSL DE HMLSL | $\begin{array}{c} 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 349\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.28(0.1)\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1$ | $\begin{array}{r} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{black} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ {\color{black} 0.64(0.1)} \\ 24(9) \\ {\color{black} 0.64(0.1)} \\ 26(6) \\ 14 \\ 0.23(0.1) \\ 26(6) \\ 14 \\ 0.23(0.1) \\ 1e0 \\ \hline 202 \\ 202 \\ 10(51) \\ 100$ | $\begin{array}{c} 1e{-1} \\ 1e{-1} \\ 1171 \\) \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1.2(2) \\ 1e{-1} \\ 214 \\ 1e{-0.61(0.1)} \\ 1e{-1} \\ 30(6) \\ 1e{-1} \\ 29(6) \\ 1e{-0.22(0.1)} \\ 29(6) \\ 1e{-1} \\ 757 \\ 1e{-0.22(0.1)} \\ 1e{-1} \\ 763 \\ 1e{-0.22(0.1)} \\ 1e{-$ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 14\\ 0.57(0.0)\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ 626\\ 42(5)\\ 40.60(0.2)\\ 1e-3\\ 1177\\ 14(5)\\ \end{array}$ | $\begin{array}{c} 1e-5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e-5\\ 335\\ 14.0.56(0.0)\\ 49(14)\\ 49(14)\\ 16(5)\\ 16(15)\\ 16(15)\\ 144(4)\\ 18(37)\\ 1e-5\\ 1467\\ recorr$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 57(16) \\ 57(16) \\ 57(16) \\ 129(176) \\ 522(6) \\ 104(114) \\ 1e-7 \\ 1673 \\ \cos(90) \end{array}$ | #succ 15/15 0/15 15/15 14/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 3/15 15/15 3/15 15/15 3/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ $\frac{\Delta f_{opt}}{f19}$ $\frac{Af_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f20}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f21}$ $\frac{\Delta f_{opt}}{f22}$ $\frac{\Delta f_{opt}}{f22}$ $\frac{\Delta f_{opt}}{f23}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 34 \\ 28 \\ 1 \\ 0 \\ 16 \\ 1.4 \\ 0 \\ 7.7 \\ (4) \\ 1.4 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\$ | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \hline 938\\ 1.4(1)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \Re^{\circ}\\) & \infty\\ 0.0)_{4} 13(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ 1008\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ \end{array}$ | $\begin{array}{c} 1.2e5\\ 1.2e5\\ \infty\\ \infty\\ 12(13)\\ 1e-5\\ 54861\\ 15(16)\\ 1.7(3)\\ 2.8(4)\\ 1e-5\\ 1729\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1.e-5\\ 1040\\ 1.4(1)\\ 91(143)\\ 1.4(0.7)\\ 1e-5\\ 33030\\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ 12(14)\\ \hline 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1.6(7)\\ 1.6(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ 34256\\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 1/15 8/15 8/15 6/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 14/15 15/15 8/15 15/15 |
| $\begin{array}{r} \Delta f_{\rm opt} \\ \hline f7 \\ MLSL \\ DE \\ HMLSL \\ \end{array}$ | $\begin{array}{c} 1e1\\ 1e1\\ 24\\ 64(61)\\ {\bf 9.0}(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 349\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.24(0.1)\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{black}{2.8(1)}} \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ {\color{black}{0.64(0.1)}} \\ 24(9) \\ {\color{black}{0.64(0.1)}} \\ 24(9) \\ {\color{black}{0.64(0.1)}} \\ 1e0 \\ \hline 500 \\ \hline 500 \\ \hline 500 \\ \hline 500 \\ 1e0 \\ \hline 500 \\ \hline 0.64(0.1) \\ 1e0 \\ \hline 202 \\ 1e0 \\ 202 \\ 14 \\ 0.21(0.1) \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ $ | $\begin{array}{c} 1e{-1} \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e{-1} \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e{-1} \\ 214 \\ 14 \\ 0.61(0.1) \\ 30(6) \\ 1e{-1} \\ 574 \\ 574 \\ 29(6) \\ 1e{-1} \\ 763 \\ 763 \\ 14 \\ 0.07(0.0) \\ 14 \\ 0.07(0.0) \\ 14 \\ 0.07(0.0) \\ 14 \\ 0.07(0.0) \\ 14 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$ | $\begin{array}{c} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 1.1(1)\\ 1e-3\\ 300\\ 14\\ 4.0.57(0.0)\\ 38(10)\\ 14\\ 4.0.57(0.0)\\ 1e-3\\ 626\\ 4.0.60(0.2)\\ 42(5)\\ .40.60(0.2)\\ 1e-3\\ 1177\\ .41.4(2)\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 14\\ 0.56(0.0)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e{-}5\\ 1467\\ 56(65)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \infty 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 57(16) \\ 129(176) \\ 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ 1673 \\ 868(986) \\ 92 \\ 129 \\ 1673 \\ 1673 \\ 868(986) \\ 92 \\ 100 \\ 1$ | $\begin{array}{c} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 0/15 \\ 0/15 \end{array}$ | $ \frac{\Delta f_{opt}}{f19} \\ \frac{\Delta f_{opt}}{f20} \\ \frac{\Delta f_{opt}}{f20} \\ \frac{\Delta f_{opt}}{f21} \\ \frac{\Delta f_{opt}}{f21} \\ \frac{\Delta f_{opt}}{f22} \\ \frac{\Delta f_{opt}}{f22} \\ \frac{\Delta f_{opt}}{f23} \\ \Delta$ | $\begin{array}{c} 1 \ e1 \\ 1 \ 1 \ e1 \\ 1 \ e1 \\ 1 \ e1 \\ 16 \\ 1.4 \ e0 \\ 1.4 \ e1 \\ 2.8 \ e3 \\ 2.5 \ e2 \\ 2.3 \ e3 \\ 2.5 \ e2 \\ 2.3 \ e3 \\ 1.6 \\ 1.4 \\ 1.4 \ e1 \ e1 \\ 1.4 \ e1 \\ 1.4 \ e1 \ e$ | $\begin{array}{c} 1 + 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\$ | $\begin{array}{c} 1.1(0)\\ 1e-1\\ 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ 1.4(10\\ 96(108)\\ 1.4(10\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0) [\P^{o}] \\) \infty\\ 0.0) [I]3(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2 \\ e5 \\ \infty \\ 12 \\ (13) \\ 1e-5 \\ 15 \\ 15 \\ (16) \\ 1.2 \\ (16) \\ 1.2 \\ (16) \\ 1.2 \\ (16) \\ 1.2 \\ (16) \\ 1.4 \\ (12) \\ 1.4 \\ (16)$ | $\begin{array}{l} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ 1e-7\\ 155313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ 1068\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ 34256\\ \infty \ le5\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 8/15 6/15 #succ 14/15 15/15 15/15 15/15 15/15 14/15 14/15 15/15 14/15 14/15 14/15 15/15 |
| $\frac{\Delta f_{\rm opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f8}$ MLSL DE HMLSL HMLSL HMLSL DE HMLSL DE HMLSL HMLSL DE HMLSL | $\begin{array}{c} 1e1\\ 24\\ 6d(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 23(9)\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.28(0.1)\\ 23(13)\\ 0.24(0.1)\\ 23(13)\\ 0.24(0.1)\\ 23(13)\\ 0.24(0.1)\\ 23(13)\\ 0.24(0.1)\\ 0.24(0$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\bf 2.8}(1) \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ {\bf 0.64}(0.1) \\ 24(9) \\ {\bf 0.64}(0.1) \\ 1e0 \\ \hline 500 \\ 26(6) \\ 14 \\ {\bf 0.23}(0.1) \\ 1e0 \\ \hline 202 \\ 100 \\ 100 \\ 202 \\ 100 \\ $ | $\begin{array}{c} 1e-1 \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1.2(2) \\ 1e-1 \\ \hline 214 \\ 1.2(2) \\ 1e-1 \\ \hline 214 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e-1 \\ \hline 574 \\ 29(6) \\ 14 \\ 0.22(0.1)_4 \\ 0.22(0.1)_4 \\ 1e-1 \\ \hline 763 \\ 763 \\ 1e-1 \\ \hline 763 \\ 1e-1 \\ 1$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ \overline{300}\\ 1e-3\\ \overline{300}\\ 14\\ 0.57(0.0)\\ 1e-3\\ 626\\ 4\\ 0.60(0.2)\\ 1e-3\\ 1177\\ 4\\ 0.60(0.2)\\ 1e-3\\ 1177\\ 14\\ 1.4(2)\\ 18(5)\\ 10\\ 0.00\\ 1e\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$ | $\begin{array}{c} 1e-5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e-5\\ 335\\ 140.56(0.0)\\ 49(14)\\ 140.56(0.0)\\ 1e-5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e-5\\ 18(37)\\ 1e-5\\ 1467\\ 56(65)\\ 20(6)\\ \infty(e_1)\end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 57(16) \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 1e-7 \\ 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ 1673 \\ 868(986) \\ 23(6)^{*2} \\ 23(6)^{*2} \\ 104(114) \\ 1e-7 \\ 1673 \\ 868(986) \\ 23(6)^{*2} \\ 104(114) \\ 1e-7 \\ 1673 \\ 868(986) \\ 23(6)^{*2} \\ 104(114) \\ 1e-7 \\ 1073 \\ 104(114) \\ 1e-7 \\ 1e-7$ | #succ 15/15 0/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 8/15 15/15 8/15 15/15 0/15 | $\begin{array}{r} \Delta f_{\rm opt} \\ \hline Af_{\rm opt} \\ \hline f19 \\ MLSL \\ DE \\ HMLSL \\$ | $\begin{array}{c} 1 \ (1) \\ 1 \ (1) \\ 1 \ (1) \\ 34 \ (28) \\ 1 \ (0) \\ 16 \\ 1.4 \ (0) \\ 1.6 \\ 1.4 \ (0) \ (0) \ (0$ | $\begin{array}{c} 1 e 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 3 \\ 3 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | $\begin{array}{c} 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \hline 938\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\end{array}$ | $\begin{array}{c} 5.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} f^{\infty}\\) & \infty\\ 0.0)_{4} 13(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.3(2)\\ 24(32)\\ 1.3(2)\\ 1.3(2)\\ 24(32)\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ \end{array}$ | $\begin{array}{c} 1.2 (2) \\ 1e-5 \\ \hline 1.2 e5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 1.4(2) \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e-5 \\ \hline 33030 \\ \infty \\ \infty \\ \infty \end{array}$ | $\begin{array}{l} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ 12(14)\\ \hline 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ \hline 1e-7\\ 1068\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ \hline 34256\\ \infty\ le5\\ \infty\ le5\\ \end{array}$ | #succ 14/15 0/15 0/15 0/15 1/15 8/15 6/15 #succ 14/15 15/15 11/15 15/15 11/15 15/15 8/15 15/15 8/15 14/15 15/15 0/15 0/15 |
| $ \begin{array}{c} \Delta f_{\rm opt} \\ \hline MLSL \\ DE \\ MLSL \\ \Delta f_{\rm opt} \\ \hline \mathbf{f7} \\ MLSL \\ DE \\ HMLSL \\ HMLSL \\ DE \\ HMLSL \\ HMLSL \\ DE \\ HMLSL \\ HM$ | $\begin{array}{c} 1 e1 \\ 1 e1 \\ 24 \\ 64(61) \\ 9.0(9) \\ 16(3) \\ 16(3) \\ 1e1 \\ 73 \\ 1.0(0.3) \\ 8.0(2) \\ 1.0(0.3) \\ 1e1 \\ 35 \\ 0.94(0) \\ 24(8) \\ 0.94(0) \\ 1e1 \\ 349 \\ 0.28(0.1) \\ 1e1 \\ 143 \\ 0.28(0.1) \\ 1e1 \\ 143 \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 23(13) \\ 0.24(0.1) \\ 0.24(0$ | $\begin{array}{r} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{red} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ {\color{red} 0.64(0.1)} \\ 24(9) \\ {\color{red} 0.64(0.1)} \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ \hline 500 \\ 14 \\ 0.23(0.1), \\ 1e0 \\ \hline 202 \\ 120 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$ | $\begin{array}{c} 1\text{e-1} \\ 1\text{171} \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1.2(2) \\ 1\text{e-1} \\ 1214 \\ 1.2(2) \\ 1\text{e-1} \\ 214 \\ 4 \ 0.61(0.1) \\ 1\text{e-1} \\ 574 \\ 29(6) \\ 14 \ 0.61(0.1) \\ 1\text{e-1} \\ 763 \\ 1\text{e-1} \\ 763 \\ 1\text{e-1} \\ 763 \\ 1\text{e-1} \\ 763 \\ 1\text{e-1} \\ 1$ | $\begin{array}{r} 1e\text{-3} \\ 1572 \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ 1e\text{-3} \\ 391 \\ 0.95(0.7) \\ 26(4) \\ 1.1(1) \\ 1e\text{-3} \\ 300 \\ 14 \\ 0.57(0.0) \\ 1e\text{-3} \\ 626 \\ 42(5) \\ 42(5) \\ 42(5) \\ 40.60(0.2) \\ 1e\text{-3} \\ 1177 \\ 1.4(2) \\ 18(5) \\ 4.10(2) \end{array}$ | $\begin{array}{r} 1e{-}5\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 49(14)\\ 14\\ 0.56(0.0)\\ 1e{-}5\\ 829\\ 16(15)\\ 14(4)\\ 18(37)\\ 1e{-}5\\ 1467\\ 56(65)\\ 206()\\ 76(104)\\ \end{array}$ | $\begin{array}{c} 1e\text{-}7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e\text{-}7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e\text{-}7 \\ 369 \\ 140.54(0.0)_4 \\ 57(16) \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e\text{-}7 \\ 1673 \\ 868(986) \\ 23(6)^{\times 2} \\ 441(475) \end{array}$ | #succ 15/15 0/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 3/15 15/15 3/15 15/15 8/15 15/15 0/15 15/15 2/15 | $\frac{\Delta f_{\rm opt}}{f19}$ $\frac{\Delta f_{\rm opt}}{f20}$ $\frac{\Delta f_{\rm opt}}{f20}$ $\frac{\Delta f_{\rm opt}}{f21}$ $\frac{\Delta f_{\rm opt}}{f21}$ $\frac{\Delta f_{\rm opt}}{f22}$ $\frac{\Delta f_{\rm opt}}{f22}$ $\frac{\Delta f_{\rm opt}}{f22}$ $\frac{\Delta f_{\rm opt}}{f23}$ $\frac{\Delta f_{\rm opt}}{f23}$ $\frac{\Delta f_{\rm opt}}{f23}$ | $\begin{array}{c} 1 \text{ (e1)} \\ 1 \text{ (10)} \\ 34(28) \\ 1 \text{ (0)} \\ 1 \text{ (0)} \\ 1 \text{ (0)} \\ 1 \text{ (10)} \\ 1 \text{ (0)} \\ 1 \text{ (10)} \\ 1 \text{ (10)} \\ 1 \text{ (10)} \\ 2.8(5) \\ 2.5(2) \\ 2.8(5) \\ 2.5(2) \\ 2.8(5) \\ 2.5(2) \\ 3.5(2) \\ 3.5(2) \\ 3.5(2) \\ 3.6(3) \\ 1 \text{ (11)} \\ 1 \text{ (10)} \\ 3.0 \\ 9.2(11) \\ 1.9(2) \\ 9.2(11) \\ 1.9(2) \\ 9.2(11) \end{array}$ | $\begin{array}{c} 160\\ 1\\ 1\\ 1\\ 0\\ 3306(1883)\\ 1(0)\\ 1e0\\ 851\\ 7.2(10)\\ 2.3(1)\\ 1e0\\ 1157\\ 0.74(0.7)\\ 1.9(2)\\ 0.88(0.7)\\ 1e0\\ 386\\ 1.8(3)\\ 69(132)\\ 2.1(2)\\ 1e0\\ 518\\ 1.9(2)\\ 31(27)\\ 2.4(2) \end{array}$ | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \hline 938\\ 1.4(1)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\\ 1.7(2)\\ \end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \Re^{\circ} \\) & \infty\\ 0.0)_{4} 3(14)\\ 1e-3\\ \overline{54470}\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1.6-3\\ 1008\\ 1.3(1)\\ 92(101)\\ 1.8(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ 45(51) \end{array}$ | $\begin{array}{c} 1.2e5\\ 1.2e5\\ \infty\\ \infty\\ 12(13)\\ 1e-5\\ 15(16)\\ 1.7(3)\\ 2.8(4)\\ 1e-5\\ 1729\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1.e-5\\ 1040\\ 1.4(1)\\ 91(143)\\ 1.4(0.7)\\ 1e-5\\ 33030\\ \infty\\ \infty\\ \infty\\ \infty\\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ \infty\ le5\\ 12(14)\\ \hline 1e-7\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ \hline 1068\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ 34256\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ \end{array}$ | #succ 15/15 0/15 0/15 1/15 #succ 14/15 14/15 11/15 15/15 11/15 8/15/15 11/15 8/15/15 11/15 8/15/15 11/15 8/15 0/15 0/15 0/15 0/15 0/15 |
| $\begin{array}{r} \Delta f_{\rm opt} \\ \hline fr \\ MLSL \\ DE \\ HMLSL \\ \Delta f_{\rm opt} \\ \hline f11 \\ MLSL \\ \Delta f_{\rm opt} \\ \Delta f_{\rm opt} \\ \end{array}$ | $\begin{array}{c} 1 e1 \\ 1 e1 \\ 24 \\ 64(61) \\ {\bf 9.0}(9) \\ 16(3) \\ 1e1 \\ 73 \\ 1.0(0.3) \\ 8.0(2) \\ 1.0(0.3) \\ 1e1 \\ 35 \\ {\bf 0.94}(0) \\ 24(8) \\ {\bf 0.94}(0) \\ 1e1 \\ 349 \\ {\bf 0.28}(0.1) \\ 23(9) \\ {\bf 0.28}(0.1) \\ 1e1 \\ 143 \\ {\bf 0.24}(0.1) \\ 23(13) \\ {\bf 0.24}(0.1) \\ 1e1 \\ 1e1 \\ \end{array}$ | $\begin{array}{c} 1 e0 \\ \hline 1 e0 \\ 324 \\ 1097(1314 \\ 2.8(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ 200 \\ 14 \\ 0.23(0.1) \\ 1e0 \\ 202 \\ 14 \\ 0.21(0.1) \\ 36(13) \\ 1e0 \\ 120$ | $\begin{array}{c} 1e-1 \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 14 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e-1 \\ 574 \\ 29(6) \\ 14 \\ 0.22(0.1)_4 \\ 1e-1 \\ 763 \\ 763 \\ 14 \\ 0.07(0.0)_4 \\ 1e-1 \\ 16(5) \\ 14 \\ 0.07(0.0)_4 \\ 1e-1 \\ 16(5) \\ 1e-1 \\ 1e-1 \\ 16(5) \\ 1e-1 \\ 1e$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 1.1(1)\\ 1e-3\\ 300\\ 144\\ 0.57(0.0)\\ 38(10)\\ 14\\ 0.57(0.0)\\ 1e-3\\ 626\\ 626\\ 40.60(0.2)\\ 42(5)\\ 40.60(0.2)\\ 1e-3\\ 1177\\ 14(2)\\ 18(5)\\ 41.0(2)\\ 1e-3\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14\\ 0.56(0.0)\\ 49(14)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e{-}5\\ 1467\\ 56(65)\\ 20(6)\\ 76(104)\\ 1e{-}5\\ \end{array}$ | $\begin{array}{c} 1\text{e-7} \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1\text{e-7} \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1\text{e-7} \\ 369 \\ 14 \\ 0.54(0.0)_{\downarrow} \\ 57(16) \\ 129(176) \\ 1\text{e-7} \\ 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1\text{e-7} \\ 1673 \\ 886(986) \\ 23(6) *2 \\ 441(475) \\ 1\text{e-7} \\ 1\text{e-7} \\ \end{array}$ | #succ 15/15 0/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 8/15 #succ 15/15 0/15 15/15 15/15 #succ 15/15 0/15 15/15 15/15 15/15 15/15 2/15 #succ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL | $\begin{array}{c} 1 \ (e1) \\ 1 \ (e1) \ (e1) \\ 1 \ (e1) \ ($ | $\begin{array}{c} 1e0\\ 1\\ 1\\ 1(0)\\ 3306(1883)\\ 1(0)\\ 1e0\\ 851\\ 7.2(10)\\ 2.3(2)\\ 2.3(1)\\ 1e0\\ 1157\\ 0.74(0.7)\\ 1.9(2)\\ 0.88(0.7)\\ 1e0\\ 386\\ 1.8(3)\\ 69(132)\\ 2.1(2)\\ 1e0\\ 518\\ 1.9(2)\\ 31(27)\\ 2.4(2)\\ 1e0\\ 1e0\\ \end{array}$ | $\begin{array}{c} 1e-1\\ \hline 242\\ 0.17(0\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ 1.4(11)\\ 96(108)\\ 1.4(11)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\\ 1.7(2)\\ 1e-1\\ \end{array}$ | $\begin{array}{c} 5.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \ensuremath{\mathbb{R}}^{\circ} \\) & \infty\\ 0.0)_{4} \ensuremath{\mathbb{R}}^{3}(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(03)\\ 2.9(4)\\ 1e-3\\ 1.7(03)\\ 2.9(4)\\ 1e-3\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ 45(51)\\ 1e-3\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2e5 \\ \infty \\ 12(13) \\ 1e-5 \\ 154861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 24(31) \\ 1.4(1) \\ 91(143) \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e-5 \\ 33030 \\ \infty \\ \infty \\ \infty \\ 1e-5 \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1.757\\ 1.4(2)\\ 24(31)\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ 1.5(1)\\ 91(95)\\ 1.5(1)\\ 91(95)\\ 1.5(1)\\ 9126\\ \infty \ le5\\ \infty \ le5\\ \infty \ le5\\ \infty \ le5\\ 1e-7\\ \end{array}$ | b)10 b)10 15/15 0/15 0/15 1/15 1/15 1/15 1/15 1/15 1/15 1/15 15/15 11/15 15/15 11/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 |
| $\begin{array}{r} \Delta f_{\rm opt} \\ \hline f7 \\ MLSL \\ DE \\ HMLSL \\ HM$ | $\begin{array}{c} 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 24(8)\\ 0.94(0)\\ 1e1\\ 143\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.24(0.1)\\ 1e1\\ 108\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ \hline 324 \\ 1097(1314 \\ {\color{black} 2.8(1)} \\ 3.8(2) \\ 1e0 \\ \hline 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ \hline 127 \\ {\color{black} 0.64(0.1)} \\ 24(9) \\ {\color{black} 0.64(0.1)} \\ 26(6) \\ 14 \\ 0.23(0.1) \\ 1e0 \\ \hline 202 \\ 14 \\ 0.23(0.1) \\ 1e0 \\ \hline 202 \\ 14 \\ 0.21(0.1) \\ 36(13) \\ 14 \\ 0.21(0.1) \\ 1e0 \\ \hline 268 \\ \end{array}$ | $\begin{array}{c} 1e{-1} \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1.2(2) \\ 1e{-1} \\ \hline 214 \\ 1.2(2) \\ 1e{-1} \\ \hline 214 \\ 0.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e{-1} \\ \hline 574 \\ 29(6) \\ 14 \\ 0.22(0.1)_4 \\ 0.22(0.1)_4 \\ 1e{-1} \\ \hline 763 \\ 14 \\ 0.07(0.0)_4 \\ 1e{-1} \\ \hline 763 \\ 14 \\ 0.07(0.0)_4 \\ 1e{-1} \\ \hline 371 \\ \hline \end{array}$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 0.95(0.7)\\ 26(4)\\ 1.1(1)\\ 1e-3\\ 300\\ 1e-3\\ 300\\ 1e-3\\ (20)\\ 40.57(0.0)\\ 1e-3\\ 40.60(0.2)\\ 1e-3\\ 1177\\ 40.60(0.2)\\ 1e-3\\ 1177\\ 41.4(2)\\ 1e-3\\ 116(2)\\ 1e-3\\ 461\\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 1e{-}5\\ 335\\ 40.56(0.0)\\ 49(14)\\ 1e{-}5\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e{-}5\\ 18(37)\\ 1e{-}5\\ 1467\\ 556(65)\\ 20(6)\\ 76(104)\\ 1e{-}5\\ 1303\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ 369 \\ 14 \\ 0.54(0.0)_4 \\ 1e-7 \\ 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ 1673 \\ 868(986) \\ 23(6)^{\ast 2} \\ 441(475) \\ 1e-7 \\ 1494 \\ \end{array}$ | $\begin{array}{l} \# {\rm succ} \\ \mbox{$\frac{15}{15}$}, \\ \m$ | $\begin{array}{r} \Delta f_{\rm opt} \\ \hline f19 \\ MLSL \\ DE \\ HMLSL \\ DE \\ HMLSL \\ DE \\ HMLSL \\ DE \\ HMLSL \\ \Delta f_{\rm opt} \\ \hline f21 \\ MLSL \\ DE \\ HMLSL \\ HM$ | $\begin{array}{c} 1 \ (e) \\ 1 \ (e) \\ 34(28) \\ 1(0) \\ 1e1 \\ 16 \\ 1.4(0) \\ 1.4(0) \\ 1.4(0) \\ 1e1 \\ 41 \\ 2.8(5) \\ 2.5(2) \\ 2.5(2) \\ 2.5(2) \\ 2.3(3) \\ 1e1 \\ 71 \\ 2.7(3) \\ 3.5(2) \\ 3.6(3) \\ 1e1 \\ 1.9(2) \\ 9.2(11) \\ 1.9(2) \\ 9.2(11) \\ 1e1 \\ 1.9(2) \\ 1622 \\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 3306(1883) \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 2.3 \\ 1 \\ 1 \\ 0 \\ 1157 \\ 0.74 \\ 0.74 \\ 0.71 \\ 1.9 \\ 2 \\ 0.74 \\ 0.74 \\ 0.71 \\ 1.9 \\ 2.3 \\ 1.9 \\ 0.74 \\ 0.74 \\ 0.71 \\ 1.9 \\ 0.74 \\ 0.74 \\ 0.71 \\ 1.9 \\ 0.74 \\ 0.74 \\ 0.71 \\ 1.9 \\ 0.74 \\ 0.$ | $\begin{array}{c} 1.1(5)\\ 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ 1.3(0.8)\\ 1.4(1)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\\ 1.7(2)\\ 1e-1\\ 6.4e6\end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} f^{ec} \\) & \infty\\ 0.0)_{4} 13(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1e-3\\ 1008\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ 45(51)\\ 1e-3\\ 9.6e6\end{array}$ | $\begin{array}{c} 1.2 \times 5 \\ 1.2 \times 5 \\ \infty \\ \infty \\ 12(13) \\ 1e \times 5 \\ 554861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e \times 5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 31030 \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e \times 5 \\ 33030 \\ \infty \\ \infty \\ \infty \\ 1e \times 5 \\ 1.3e7 \\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ \hline 1e-7\\ 55313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.4(2)\\ 24(31)\\ 1.4(2)\\ 24(31)\\ 1.5(1)\\ 91(95)\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ \hline 1e-7\\ \hline 34256\\ \infty \ le5\\ \infty \ le5\\ \infty \ le5\\ 1.3e7\\ \hline \end{array}$ | $\begin{array}{l} 0,10\\ \mu \text{succ}\\ 15/15\\ 0/15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 8/15\\ 1/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 14/15\\ 14/15\\ 0/$ |
| $\begin{array}{r} \Delta f_{opt} \\ \hline fr \\ MLSL \\ DE \\ MLSL \\ DE \\ MSL \\ DE \\ MSL \\ DE \\ MLSL \\ DE \\ MLSL \\ DE \\ HMLSL \\ DE \\ MLSL \\ DE \\ MLSL \\ DE \\ MLSL \\ DE \\ MLSL \\ MLSL \\ DE \\ MLSL \\ DE \\ MLSL \\ MLSL \\ DE \\ MLSL \\ $ | $\begin{array}{c} 1 e1 \\ 1 e1 \\ 24 \\ 64(61) \\ {\bf 9.0}(9) \\ 16(3) \\ 16(3) \\ 1e1 \\ 73 \\ 1.0(0.3) \\ 8.0(2) \\ 1.0(0.3) \\ 1e1 \\ 35 \\ 0.94(0) \\ 24(8) \\ 0.94(0) \\ 24(8) \\ 0.94(0) \\ 1e1 \\ 349 \\ 0.28(0.1) \\ 1e1 \\ 143 \\ 0.24(0.1) \\ 123(13) \\ 0.24(0.1) \\ 161 \\ 108 \\ 1.3(0.4) \end{array}$ | $\begin{array}{r} 1 e0 \\ \hline 1 e0 \\ 324 \\ 1097(1314 \\ 2.8(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 127 \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 1e0 \\ \hline 500 \\ 500 \\ 14 \\ 0.23(0.1) \\ 1e0 \\ 202 \\ 14 \\ 0.21(0.1) \\ 36(13) \\ 36(13) \\ 1e0 \\ 268 \\ 0.94(0.6) \\ 100 \\ $ | $\begin{array}{c} 1e{-1} \\ 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 1e{-1} \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e{-1} \\ 214 \\ 1.2(2) \\ 1e{-1} \\ 306 \\ 1006 \\ 1006 \\ 1006 \\ 1006 \\ 1000 \\ 100$ | $\begin{array}{r} 1e-3\\ 1572\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e-3\\ 391\\ 1.1(1)\\ 1e-3\\ 300\\ 14\ 0.57(0.0)\\ 48(10)\\ 14\ 0.57(0.0)\\ 1e-3\\ 626\\ 4\ 0.60(0.2)\\ 42(5)\\ 40.60(0.2)\\ 1e-3\\ 1177\\ 4.1.4(2)\\ 18(5)\\ 18(5)\\ 4.1.0(2)\\ 1e-3\\ 461\\ 0.93(0.8)\end{array}$ | $\begin{array}{r} 1e{-5} \\ 1572 \\ \infty \\ \infty \\ 2.8(0.8) \\ 8.5(2) \\ 1e{-5} \\ 410 \\ 0.97(0.6) \\ 36(6) \\ 1.1(1) \\ 1e{-5} \\ 335 \\ 4.9(14) \\ 4.0.56(0.0) \\ 4.9(14) \\ 1e{-5} \\ 829 \\ 16(15) \\ 44(4) \\ 18(37) \\ 1e{-5} \\ 1467 \\ 56(65) \\ 20(6) \\ 76(104) \\ 1e{-5} \\ 1303 \\ 1.5(2) \end{array}$ | $\begin{array}{c} 1\text{e-7} \\ \hline 1597 \\ \approx 5e_4 \\ 3.0(1) \\ 8.8(2) \\ \hline 1e-7 \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e-7 \\ \hline 369 \\ 1.1(1) \\ 1e-7 \\ \hline 369 \\ 129(176) \\ 57(16) \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ \hline 880 \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e-7 \\ \hline 38(58) \\ 23(6)^{\star 2} \\ 441(475) \\ \hline 1e-7 \\ 1494 \\ 38(55) \end{array}$ | $\begin{array}{l} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 4^{\rm succ} \\ 15/15 \\ 8^{\rm succ} \\ 15/15 \\ 8^{\rm succ} \\ 15/15 \\ 15/15 \\ 8^{\rm succ} \\ 15/15 \\ 15/15 \\ 15/15 \\ 5/15 \\ 15/15 \\ 2/15 \\ \end{array}$ | $\begin{array}{r} \Delta f_{\rm opt} \\ \hline \frac{Af_{\rm opt}}{f19} \\ MLSL \\ DE \\ HMLSL \\ \Delta f_{\rm opt} \\ \frac{f23}{f23} \\ MLSL \\ DE \\ F23 \\ MLSL \\ DE \\ HMLSL \\ MLSL \\ DE \\ HMLSL \\ HM$ | $\begin{array}{c} 1 \ \ e1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1$ | $\begin{array}{c} 1e-1\\ \hline 242\\ 0.17(0\\ 1087(1102\\ 0.17(0\\ 1e-1\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ \hline 938\\ 1.4(1)\\ 96(108)\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\\ 1.7(2)\\ 1e-1\\ 6.4e6\\ \infty\end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} \Re^{\infty} \\) & \infty\\ 0.0)_{4} 3(14)\\ 1e-3\\ 554470\\ 155(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1.3(2)\\ 24(32)\\ 1.1(0.6)\\ 1.6-3\\ 1008\\ 1.3(1)\\ 92(101)\\ 1.8(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ 45(51)\\ 1e-3\\ 9.6e6\\ \infty\\ \end{array}$ | $\begin{array}{c} 1.2 \times 5 \\ 1.2 \times 5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 54861 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.1(0.6) \\ 1.e-5 \\ 1040 \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e-5 \\ 33030 \\ \infty \\ \infty \\ \infty \\ 1e-5 \\ 1.3e7 \\ \infty \\ \end{array}$ | $\begin{array}{c} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty\ le5\\ \infty\ le5\\ 12(14)\\ \hline 1e-7\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ \hline 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1.6(1)\\ 91(95)\\ 1.5(1)\\ 91(95)\\ 1.5(0.8)\\ \hline 1e-7\\ 34256\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ \infty\ le5\\ 1e-7\\ 1.3e7\\ \infty\ 6e4\\ \end{array}$ | $\begin{array}{l} 0,15\\ \mu {\rm succ}\\ 15/15\\ 0,15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 14/15\\ 15/15\\ 14/15\\ 0/1$ |
| $\begin{array}{r} \Delta f_{\rm opt} \\ \hline fr \\ MLSL \\ DE \\ HMLSL \\ HM$ | $\begin{array}{c} 1e1\\ 1e1\\ 24\\ 64(61)\\ 9.0(9)\\ 16(3)\\ 1e1\\ 73\\ 1.0(0.3)\\ 8.0(2)\\ 1.0(0.3)\\ 1e1\\ 35\\ 0.94(0)\\ 24(8)\\ 0.94(0)\\ 1e1\\ 23(9)\\ 0.28(0.1)\\ 23(9)\\ 0.28(0.1)\\ 1e1\\ 143\\ 0.24(0.1)\\ 1e1\\ 108\\ 1.3(0.4)\\ 61(18)\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ \hline 1 e0 \\ 324 \\ 1097(1314 \\ 2.8(1) \\ 3.8(2) \\ 1e0 \\ 273 \\ 1.0(1.0) \\ 7.6(2) \\ 1.3(2) \\ 1e0 \\ 127 \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 24(9) \\ 0.64(0.1) \\ 26(6) \\ 202 \\ 202 \\ 14 \\ 0.23(0.1) \\ 1e0 \\ 202 \\ 202 \\ 14 \\ 0.21(0.1) \\ 36(13) \\ 1e0 \\ 202 \\ 202 \\ 100 \\ 202 \\ 100 \\ 202 \\ 100 \\ 1$ | $\begin{array}{c} 1e-1 \\ \hline 1171 \\) & \infty \\ 1.7(1) \\ 8.7(1) \\ 8.7(1) \\ 1e-1 \\ 336 \\ 0.99(0.8) \\ 17(3) \\ 1.2(2) \\ 1e-1 \\ 214 \\ 10.61(0.1) \\ 30(6) \\ 14 \\ 0.61(0.1) \\ 1e-1 \\ 574 \\ 29(6) \\ 29(6) \\ 1e-1 \\ 763 \\ 16(5) \\ 1e-1 \\ 763 \\ 14 \\ 0.07(0.0)_4 \\ 1e-1 \\ 371 \\ 0.89(0.7) \\ 70(47) \\ \end{array}$ | $\begin{array}{r} 1\text{e-3} \\ 1\text{572} \\ \infty \\ 2.8 (0.8) \\ 8.5 (2) \\ 1\text{e-3} \\ 391 \\ 0.95 (0.7) \\ 26 (4) \\ 1.1 (1) \\ 1\text{e-3} \\ 300 \\ 38 (10) \\ 14 \\ 0.57 (0.0) \\ 38 (10) \\ 14 \\ 0.57 (0.0) \\ 1\text{e-3} \\ 40.60 (0.2) \\ 42 (5) \\ 1\text{e-3} \\ 1177 \\ 14 \\ (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 (2) \\ 18 (5) \\ .4 \\ 1.4 \\ .4 \\ 1.4 \\ .4 \\ .4 \\ .4 \\ $ | $\begin{array}{c} 1e{-}5\\ 1572\\ \infty\\ \infty\\ 2.8(0.8)\\ 8.5(2)\\ 1e{-}5\\ 410\\ 0.97(0.6)\\ 36(6)\\ 1.1(1)\\ 1e{-}5\\ 335\\ 14 \ 0.56(0.0)\\ 49(14)\\ 14 \ 0.56(0.0)\\ 1e{-}5\\ 829\\ 16(15)\\ 44(4)\\ 18(37)\\ 1e{-}5\\ 1467\\ 56(65)\\ 20(6)\\ 76(104)\\ 1e{-}5\\ 1303\\ 1.5(2)\\ 58(44)\\ \end{array}$ | $\begin{array}{c} 1e{-7} \\ 1597 \\ \approx 5e4 \\ 3.0(1) \\ 8.8(2) \\ 1e{-7} \\ 422 \\ 0.96(0.6) \\ 46(6) \\ 1.1(1) \\ 1e{-7} \\ 369 \\ 14 \\ 0.54(0.0)_4 \\ 57(16) \\ 129(176) \\ 57(16) \\ 129(176) \\ 52(6) \\ 104(114) \\ 1e{-7} \\ 1673 \\ 8868(986) \\ 23(6)^{*2} \\ 441(475) \\ 1e{-7} \\ 1494 \\ 38(55) \\ 64(41) \end{array}$ | $\begin{array}{l} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 2/15 \\ 2/15 \\ 2/15 \\ 5/15 \\ 5/15 \\ 11/15 \end{array}$ | $\begin{array}{r} \Delta f_{\rm opt} \\ \hline f19 \\ MLSL \\ DE \\ HMLSL \\ HMLSL$ | $\begin{array}{c} 1 \mathrm{el} \\ 1 \mathrm{1el} \\ 2 \mathrm{s} (\mathrm{s}) \\ 2 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{el} \\ 3 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{1el} \\ 3 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{1el} \\ 1 \mathrm{s} (\mathrm{s}) \\ 9 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{1el} \\ 1 \mathrm{s} (\mathrm{s}) \\ 9 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{el} \\ 1 \mathrm{s} (\mathrm{s}) \\ 9 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \mathrm{s} (\mathrm{s}) \\ 9 \mathrm{s} (\mathrm{s}) \\ 1 \mathrm{el} \\ 1 \\ 1 $ | $\begin{array}{c} 1e(0)\\ 1\\ 1e(0)\\ 1\\ 1(0)\\ 3306(1883)\\ 1(0)\\ 1e(0)\\ 851\\ 7.2(10)\\ 2.3(1)\\ 1e(0)\\ 1157\\ 0.74(0.7)\\ 1.9(2)\\ 0.88(0.7)\\ 1e(0)\\ 386\\ 1.8(3)\\ 69(132)\\ 2.1(2)\\ 1e(0)\\ 518\\ 1.9(2)\\ 31(27)\\ 2.4(2)\\ 1e(0)\\ 2.2e5\\ 4.2(5)\\ \infty \end{array}$ | $\begin{array}{c} 1e-1\\ 242\\ 0.17(0\\ 1e-7\\ 0.17(0\\ 1e-1\\ 38111\\ 21(25)\\ 2.4(4)\\ 4.1(5)\\ 1e-1\\ 1674\\ 1.3(2)\\ 23(31)\\ 1.1(0.6)\\ 1e-1\\ 938\\ 1.3(0.8)\\ 1e-1\\ 14249\\ 2.0(2)\\ \infty\\ 1.7(2)\\ 1e-1\\ 6.4e6\\ \infty\\ \infty\end{array}$ | $\begin{array}{c} 0.2(1)\\ 1e-3\\ \hline 1.2e5\\ 0.0)_{4} {\bf f}^{\infty}\\) \\ \infty\\ 0.0)_{4} {\bf 13}(14)\\ 1e-3\\ 554470\\ 15(18)\\ 1.7(3)\\ 2.9(4)\\ 1e-3\\ 1705\\ 1.3(2)\\ 24(32)\\ 1.3(2)\\ 1.3(2)\\ 1.3(2)\\ 1.3(1)\\ 92(101)\\ 1.3(1)\\ 92(101)\\ 1.3(0.7)\\ 1e-3\\ 31654\\ 22(23)\\ \infty\\ 45(51)\\ 1e-3\\ 9.6e6\\ \infty\\ \infty\\ \end{array}$ | $\begin{array}{c} 1.2 \\ 1e-5 \\ \hline 1.2e5 \\ \infty \\ \infty \\ 12(13) \\ 1e-5 \\ 15(16) \\ 1.7(3) \\ 2.8(4) \\ 1e-5 \\ 1729 \\ 1.4(2) \\ 24(31) \\ 1.4(2) \\ 24(31) \\ 1.4(0.6) \\ 1e-5 \\ 1040 \\ 1.4(1) \\ 91(143) \\ 1.4(0.7) \\ 1e-5 \\ 33030 \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e-5 \\ 1.3e7 \\ \infty \\ $ | $\begin{array}{l} 14(12)\\ 1e-7\\ \hline 1.2e5\\ \infty \ le5\\ 12(14)\\ 1e-7\\ 155313\\ 15(16)\\ 1.7(2)\\ 2.8(4)\\ 1e-7\\ 1757\\ 1.4(2)\\ 24(31)\\ 1.4(2)\\ 24(31)\\ 1.1(0.6)\\ 1e-7\\ 1.6(1)\\ 91(95)\\ 1.5(0.8)\\ 1e-7\\ \hline 34256\\ \infty \ le5\\ \infty \ le5\\ \infty \ le5\\ 1e-7\\ \hline 1.3e7\\ \infty \ 6e4\\ \infty \ le5\\ \end{array}$ | $\begin{array}{c} 0,15\\ \mu \text{succ}\\ 15/15\\ 0/15\\ 1/15\\ 1/15\\ 1/15\\ 1/15\\ 8/15\\ 1/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 15/15\\ 0/15\\$ |

Table 1: Expected running time (ERT in number of function evaluations) divided by the respective best ERT measured during BBOB-2009 (given in the respective first row) for different Δf values in dimension 5. The central 80% range divided by two is given in braces. The median number of conducted function evaluations is additionally given in *italics*, if $\text{ERT}(10^{-7}) = \infty$. #succ is the number of trials that reached the final target $f_{\text{opt}} + 10^{-8}$. Best results are printed in bold.

| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
|---|--|---|--|---|---|--|--|--|---|---|---|--|--|--|--|
| f1 | 43 | 43 | 43 | 43 | 13 | 43 | 15/15 | -70pt | 652 | 2021 | 2751 | 18749 | 24455 | 30201 | 15/15 |
| MISI | 077(0.2) | 17(0.5) | 10(0.2) | 3 8 (0.2) | 97 (05) | 47(0.5) | 15/15 | MISI | 1 1 (0 2) | 0.68(0.2) | 0.07(1 | 0) 0 50(0 | 7) 24400 | 00201 | 0/15 |
| DE | 0.11(0.2) | 1.7(0.3) | 1.9(0.2) | 2.8(0.2) | 5.7(0.5) | 4.7(0.3) | 15/15 | DE | 1.1(0.2) | 100(110) | 0.97(1. | 0.59(0 | .7) ∞ | 00 4 6 5 | 0/15 |
| DE | 62(11) | 140(15) | 220(15) | 377(19) | 530(20) | 687(22) | 15/15 | DE | 50(9) | 103(110) | 2144(2399) |) ∞ | ~~ | ∞ 4 <i>e</i> 5 | 0/15 |
| HMLSL | 0.77(0.2) | 1.7(0.5) | 1.9(0.2) | 2.8(0.2) | 3.7(0.5) | 4.7(0.5) | 15/15 | HMLSL | 1.1(0.2) | 0.82(0.2) | 13(4) | 43(64) | ~~ | ∞ 4 <i>eə</i> | 0/15 |
| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| f2 | 385 | 386 | 387 | 390 | 391 | 393 | 15/15 | f14 | 75 | 239 | 304 | 932 | 1648 | 15661 | 15/15 |
| MLSL | 5.1(2) | 5.7(2) | 6.1(2) | 7.2(3) | 10 (3) | 13 (9) | 15/15 | MLSL | 0.74(0.3) | 0.49 (0.1) | 12 0.65(0.1) | 100.65(0.1) | 140.67(0.1) | 1 ∞ 4e5 | 0/15 |
| DE | 34(2) | 43(2) | 51(3) | 68(2) | 85(2) | 102(3) | 15/15 | DE | 22(7) | 29(2) | 42(4) | 12 · · · (· · / | 44 · · · (· /) | m les | 0/15 |
| HMLSL | 5.1(2) | 5.7(2) | 6.1(2) | 7.2(3) | 10(3) | 15(15) | 15/15 | HMLSI | 0.74(0.3) | 0.49(0.1) | 0.65(0.1) | 0.65(0.1) | 0.67 (0.1) | 1 00 105 | 0/15 |
| A. C | 1 (-) | 1.0 | | 1 0 | | 1 7 | 1.07 - 0 | | 0.0.1 | 0110(011) | 13 0100(0.1) | 120100(011) | 140.01 (0.1) | 4 400 | 10/10 |
| ΔJ_{opt} | lei | 160 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| f3 | 5066 | 7626 | 7635 | 7643 | 7646 | 7651 | 15/15 | f15 | 30378 | 1.5e5 | 3.1e5 | 3.2e5 | 4.5e5 | 4.6e5 | 15/15 |
| MLSL | ~ | ∞^{*4} | ∞^{*4} | ∞^{*4} | ∞^{*4} | $\infty 4e5^{*4}$ | 0/15 | MLSL | ∞* ³ | ∞* ³ | ∞* ³ | ∞* ³ | ∞* ³ | $\infty 4e5 \times 3$ | 0/15 |
| DE | ~ | ∞ | ∞ | ∞ | ∞ | ∞ 4e5 | 0/15 | DE | ~ | ~ | ~ | ∞ | ~ | ∞ 4e5 | 0/15 |
| HMLSL | 219(208)* | 4 ∞ | ~ | ~ | ~ | ∞ <i>ke5</i> | 0/15 | HMLSI | ~~~~ | ~ | ~ | ~ | ~ | ∞ ke5 | 0/15 |
| A. C | 1 () | 1.0 | 1 1 | 1 0 | 1 5 | 1 7 | 1 | A.C. | la a | 1.0 | | 1 0 | | 1 7 | 1 0/ -0 |
| $\Delta f_{\rm opt}$ | 161 | 160 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | lei | 160 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| f4 | 4722 | 7628 | 7666 | 7700 | 7758 | 1.4e5 | 9/15 | f16 | 1384 | 27265 | 77015 | 1.9e5 | 2.0e5 | 2.2e5 | 15/15 |
| MLSL | ~ | ∞^{*4} | ∞^{*4} | ∞^{*4} | ∞^{*4} | $\infty 4e5^{*4}$ | 0/15 | MLSL | 1274(1415) | ~ | ~ | ~ | ~ | ∞ 4e5 | 0/15 |
| DE | 620(593) | ∞ | ∞ | ∞ | ∞ | ∞ 4e5 | 0/15 | DE | ∞ | ~ | ~ | ~ | ~ | ∞ 4e5 | 0/15 |
| HMLSL | 622(626) | ∞ | ∞ | ∞ | ∞ | ∞ 4e5 | 0/15 | HMLSL | 478 (497) | ~ | ~ | ~ | ~ | ∞ 4e5 | 0/15 |
| Δf. | 101 | 1e0 | 16-1 | 10-3 | 1e-5 | 1e-7 | Hence | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| | 101 | 41 | 41 | 10-0 | 10-0 | 10-1 | 15/15 | f17 | 63 | 1030 | 4005 | 30677 | 56288 | 80472 | 15/15 |
| 15 | 41 | 41 | 41 | 41 | 41 | 41 | 15/15 | MIGI | 00(00) | 1000 | 1000 | 00011 | 00200 | *4 | 0/15 |
| MLSL | 3.6 (0) | 5.2(0) | 5.7(0) | 6.7 (0) | 7.3(0) | 118(93) ^{^3} | 1/15 | DE | 22(30) | 15(0) | 14(0) | 10(7) | 00 (117) | ∞ 4 <i>eb</i> | 0/15 |
| DE | 598(66) | 1428(102) | 2298(132) | 3987(157) | 5710(197) | 7445(223) | 15/15 | DE | 8.2(4) | 17(3) | 14(2) | 10(7) | 105(117) | ∞ 4e5 | 0/15 |
| HMLSL | 3.6 (0) | 5.2(0) | 5.7(0) | 6.7 (0) | 7.3(0) | 5412(4236) | 14/15 | HMLSL | 24(41) | 21(7) | 18(4) | 15(9) | ~ | ∞ 4eo | 0/15 |
| Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | Δf_{opt} | 1e1 | 1e0 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ |
| | 1296 | 23/13 | 3/13 | 5220 | 6728 | 8409 | 15/15 | f18 | 621 | 3972 | 19561 | 67569 | 1.3e5 | 1.5e5 | 15/15 |
| MISL | 1 8(1) | 15(0.9) | 15(0.9) | 18(0.7) | 21(0.6) | 27(0.6) | 15/15 | MLSL | ~ | ~ | ~ | $\infty^{\star 4}$ | $\infty^{\star 4}$ | ∞ 4e5*4 | 0/15 |
| DE | 49(27) | 63(18) | 65(18) | 114(82) | ~ 2.1(0.0) | 2.1(0.0) | 0/15 | DE | 19(5) | 19(5) | 10(13) | ~ | ~ | ~ 1e5 | 0/15 |
| HMLSI | 1 8(1) | 1 5(0.9) | 1 5(0.9) | 18(0.7) | 21(0.6) | 2 5(0.6) | 15/15 | HMLSI | 18(4) | 22(6) | 20(13) | ~ | ~ | ~ 1e5 | 0/15 |
| IIWILDL | 11.0(1) | 1.0(0.5) | 1.0(0.5) | 1.0(0.1) | 2.1(0.0) | 2.0(0.0) | 10/10 | 111011101 | 10(4) | 22(0) | 20(10) | | | <i>∞</i> 400 | 10/10 |
| | 11-1 | 1 0 | | 1 0 | | | | | | 1 () | 1 - 1 | 1 12 | 1 5 | 1 - 7 | |
| Δf_{opt} | Ter | 160 | 1e-1 | 1e-3 | 1e-5 | 1e-7 | #succ | ΔJ_{opt} | 161 | 160 | 1e-1 | 1e-5 | 1e-5 | 1e-7 | #succ |
| Δf _{opt} f7 | 1351 | 4274 | 9503 | 16524 | 16524 | 1e-7 16969 | #succ 15/15 | f19 | 1 | 1 | 3.4e5 | 6.2e6 | 1e-5 6.7e6 | 6.7e6 | #succ 15/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL | 1351 ∞ | 4274 ∞ | 9503 ∞ | 16524 ∞ | 1e-5 16524 ∞ | 1e-7 16969 ∞ 2e5 | #succ 15/15 0/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL | 1 1 1(0) | 1 1 1(0) | 3.4e5 7.3e- | 6.2e6 ∞ | 6.7e6 ∞ | 6.7e6 ∞ 4e5 | #succ 15/15 0/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE | $1351 \\ \infty \\ 21(5)$ | 4274 ∞ 77(57) | 9503 ∞ 67(63) | 16-3 16524 ∞ 118(121) | 1e-5 16524 ∞ 118(111) | 1e-7 16969 $\infty 2e5$ 115(119) | #succ 15/15 0/15 2/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL | 1 1 1(0) | 1 1(0) | 3.4e5 7.3e- 4(0)↓4 | 6.2e6 ∞ | 6.7e6 ∞ | 6.7e6 ∞ 4e5 | #succ 15/15 0/15 |
| $\frac{\Delta f_{\rm opt}}{\mathbf{f7}}$ MLSL DE HMLSL | $1351 \\ \infty \\ 21(5) \\ 21(5)$ | 1e0 4274 ∞ 77(57) 72(54) | 1e-1 9503 ∞ 67(63) 65(49) | 16-3 16524 ∞ 118(121) 175(182) | 16-5 16524 ∞ 118(111) 175(176) | $16969 \\ \infty 2e5 \\ 115(119) \\ 343(395) $ | #succ 15/15 0/15 2/15 1/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE | 1 1 1(0) 1337(554) | 1 1(0) ∞ | 3.4e5 7.3e- 4(0)↓4 ∞ | 6.2e6 ∞ ∞ | 1e-5 6.7e6 ∞ ∞ | 6.7e6 ∞ 4e5 ∞ 4e5 | #succ 15/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL Δf | 1351 ∞ 21(5) 21(5) | 1e0 4274 ∞ 77(57) 72(54) 1e0 | 1e-1 9503 ∞ 67(63) 65(49) 1e-1 | 16-3 16524 ∞ 118(121) 175(182) 1e-3 | 1e-5 16524 ∞ 118(111) 175(176) 1e-5 | $1e-7$ 16969 $\infty 2e5$ $115(119)$ $343(395)$ $1e-7$ | #succ 15/15 0/15 2/15 1/15 #succ | Δf_{opt} f19 MLSL DE HMLSL | 1 1 1(0) 1337(554) 1(0) | 100 1 1(0) ∞ 1(0) | 3.4e5 7.3e- 4(0)↓4 ∞ 7.3e- | 6.2e6 ∞ ∞ | 1e-5 6.7e6 ∞ ∞ | $6.7e6$ $\infty 4e5$ $\infty 4e5$ $\infty 4e5$ | #succ 15/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f7}$ | $1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2020 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $ | $ \begin{array}{c} 1e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 2871 \end{array} $ | 1e-1 9503 ∞ 67(63) 65(49) 1e-1 4040 | $ \begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4210 \\ \end{array} $ | 1e-5 16524 ∞ 118(111) 175(176) 1e-5 4271 | $1e-7$ 16969 $\infty 2e5$ $115(119)$ $343(395)$ $1e-7$ 4484 | #succ 15/15 0/15 2/15 1/15 #succ 15/15 | Δf_{opt} f19 MLSL DE HMLSL | 1 1 1(0) 1337(554) 1(0) | 1100 1(0) 1(0) | 3.4e5 7.3e- $4(0)_{\downarrow 4}$ ∞ 7.3e- $4(0)_{\downarrow 4}$ | 6.2e6 ∞ ∞ | 6.7e6 ∞ ∞ | $6.7e6$ $\infty 4e5$ $\infty 4e5$ $\infty 4e5$ | #succ 15/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL | $ \begin{array}{c} 181\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ \end{array} $ | $ \begin{array}{c} 1e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 3871 \\ 0.78(0.5) \end{array} $ | $ \begin{array}{r} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0 \\ 79(0,5) \\ \end{array} $ | $ \begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \end{array} $ | $ \begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \end{array} $ | $1e-7$ 16969 $\approx 2e5$ $115(119)$ $343(395)$ $1e-7$ 4484 $0.78(0.5)$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 | Δf_{opt} f19 MLSL DE HMLSL | 1 1 1(0) 1337(554) 1(0) | 100 1 1(0) ∞ 1(0) | 3.4e5 7.3e- 4(0)↓4 ∞ 7.3e- 4(0)↓4 | 6.2e6 ∞ ∞ | 6.7e6 ∞ ∞ | $6.7e6$ $\infty 4e5$ $\infty 4e5$ $\infty 4e5$ $1e.7$ | #succ 15/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE | $\begin{array}{c} 1 e1 \\ 1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2039 \\ 0.84(0.2) \\ 12(1) \end{array}$ | 1e0 4274 ∞ 77(57) 72(54) 1e0 3871 0.78(0.5) 27(52) | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 20(48) \end{array}$ | $1e-5$ 16524 ∞ $118(111)$ $175(176)$ $1e-5$ 4371 $0.79(0.5)$ $20(46)$ | 1e-7 16969 $\infty 2e5$ 115(119) 343(395) 1e-7 4484 0.78(0.5) 22(45) | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f}$ | 1 1 1(0) 1337(554) 1(0) 1e1 | 100 1 1(0) ∞ 1(0) 1e0 | 3.4e5 7.3e- 4(0)↓4 ∞ 7.3e- 4(0)↓4 1e-1 | 6.2e6 ∞ ∞ ∞ | 1e-5 6.7e6 ∞ ∞ 1e-5 | $1e-7$ 6.7e6 ∞ 4e5 ∞ 4e5 $1e-7$ $1e-7$ | #succ 15/15 0/15 0/15 0/15 #succ |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL DE HLSL DE | $\begin{array}{c} 1 \\ 1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2039 \\ 0.84(0.2) \\ 13(1) \\ 0.84(0.2) \end{array}$ | $\begin{array}{c} 1e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 10(1) \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ \hline 4040 \\ 0.79(0.5) \\ 27(50) \\ 10(1) \\ \end{array}$ | $\begin{array}{c} 1e-3 \\ \hline 16524 \\ \infty \\ 118(121) \\ 175(182) \\ \hline 1e-3 \\ \hline 4219 \\ 0.79(0.5) \\ 29(48) \\ 10(1) \end{array}$ | $\begin{array}{c} 1e{-}5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e{-}5 \\ \hline 4371 \\ 0.79(0.5) \\ 30(46) \\ 10(1) \end{array}$ | $1e-7$ $16969 \\ \infty 2e5$ $115(119)$ $343(395)$ $1e-7$ 4484 $0.78(0.5)$ $32(45)$ $0.00(1)$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 13/15 | $\frac{\Delta f_{\text{opt}}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{\text{opt}}}{\mathbf{f20}}$ | 1e1 1 1(0) 1337(554) 1(0) 1e1 82 | | $\begin{array}{c} 3.4e5\\ \textbf{7.3e-}\\ 4(0)_{\downarrow 4}\\ \infty\\ \textbf{7.3e-}\\ 4(0)_{\downarrow 4}\\ 1e-1\\ \hline 3.1e6 \end{array}$ | 6.2e6 ∞ ∞ 1e-3 5.5e6 | 1e-5 6.7e6 ∞ ∞ 1e-5 5.6e6 | $ \begin{array}{r} 1e-7 \\ 6.7e6 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 5.6e6 \\ 4 4 4 4 4 $ | #succ 15/15 0/15 0/15 0/15 #succ 14/15 |
| $\frac{\Delta f_{opt}}{\mathbf{f7}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f8}}$ MLSL DE HMLSL | $\begin{array}{c} 1 e1 \\ 1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2039 \\ 0.84(0.2) \\ 13(1) \\ 0.84(0.2) \end{array}$ | $\begin{array}{c} 1e0 \\ 4274 \\ \infty \\ 77(57) \\ \textbf{72}(54) \\ 1e0 \\ 3871 \\ \textbf{0.78}(0.5) \\ 27(52) \\ 1.0(1) \end{array}$ | $\begin{array}{c} 1e-1 \\ \hline 9503 \\ \infty \\ 67(63) \\ 65(49) \\ \hline 1e-1 \\ \hline 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \end{array}$ | $\begin{array}{c} \frac{1e-3}{16524} \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ \hline 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \end{array}$ | $\begin{array}{c} 1e{-}5\\ \hline 16524\\ \infty\\ 118(111)\\ 175(176)\\ 1e{-}5\\ 4371\\ 0.79(0.5)\\ 30(46)\\ 1.0(1) \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \infty\ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ \end{array}$ | $\begin{array}{c} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 2/15 \\ 1/15 \\ \# {\rm succ} \\ 15/15 \\ 15/15 \\ 13/15 \\ 15/15 \end{array}$ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\$ | $ \begin{array}{r} 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ $ | $\begin{array}{c} 3.4e5\\ \textbf{7.3e-}\\ \textbf{4}(0)_{\downarrow 4}\\ \textbf{\infty}\\ \textbf{7.3e-}\\ \textbf{4}(0)_{\downarrow 4}\\ \textbf{1e-1}\\ \textbf{3.1e6}\\ \textbf{\infty} \end{array}$ | $ \begin{array}{c} 1e-3 \\ 6.2e6 \\ \infty \\ \infty \\ 1e-3 \\ 5.5e6 \\ \infty^{*4} \end{array} $ | $ \begin{array}{c} 1e-5 \\ 6.7e6 \\ \infty \\ \infty \\ 1e-5 \\ 5.6e6 \\ \infty^{*4} \end{array} $ | $ \begin{array}{r} 1e-7 \\ 6.7e6 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 5.6e6 \\ \infty 4e5^{\star 4} \end{array} $ | #succ 15/15 0/15 0/15 0/15 #succ 14/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL DE HMLSL Δf_{opt} | $\begin{array}{c} 1 \\ 1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2039 \\ 0.84(0.2) \\ 13(1) \\ 0.84(0.2) \\ 1e1 \end{array}$ | $\begin{array}{c} 1 e 0 \\ 4 274 \\ \infty \\ 77 (57) \\ \textbf{72} (54) \\ 1 e 0 \\ 3871 \\ \textbf{0.78} (0.5) \\ 27 (52) \\ 1.0 (1) \\ 1 e 0 \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \end{array}$ | $\begin{array}{c} 1e-3 \\ \hline 1e-3 \\ \hline 16524 \\ \infty \\ 118(121) \\ 175(182) \\ \hline 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \end{array}$ | $\begin{array}{c} 1e{-}5\\ 16524\\ \infty\\ 118(111)\\ 175(176)\\ 1e{-}5\\ 4371\\ 0.79(0.5)\\ 30(46)\\ 1.0(1)\\ 1e{-}5\\ \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \varpi\ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 13/15 15/15 #succ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\$ | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ (0) \\ \hline 0 \\ 1 \\ 46150 \\ 11 \\ (10) \\ 2.8 \\ (1) \end{array} $ | $\begin{array}{c} 3.4e5\\ \textbf{7.3e-}\\ \textbf{4}(0)_{\downarrow 4}\\ \infty\\ \textbf{7.3e-}\\ \textbf{4}(0)_{\downarrow 4}\\ 1e-1\\ 3.1e6\\ \infty\\ \infty\end{array}$ | $ \begin{array}{c} 1e-3 \\ 6.2e6 \\ \infty \\ \infty \\ 1e-3 \\ 5.5e6 \\ \infty^{\star 4} \\ \infty \end{array} $ | $ \begin{array}{c} 1e-5 \\ \infty \\ \infty \\ 1e-5 \\ 5.6e6 \\ \infty^{\star 4} \\ \infty \end{array} $ | $ \begin{array}{r} 1e-7 \\ 6.7e6 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 5.6e6 \\ \infty 4e5 \\ *4 \\ \infty 4e5 \\ \end{array} $ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ | $\begin{array}{c} 111\\ 11351\\ \infty\\ 21(5)\\ 21(5)\\ 11e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 11e1\\ 1716\\ \end{array}$ | $\begin{array}{c} 1 e 0 \\ 4 274 \\ \infty \\ 77(57) \\ 72(54) \\ 1 e 0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e 0 \\ 3102 \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \end{array}$ | $\begin{array}{c} 1e-3 \\ \hline 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \end{array}$ | $\begin{array}{c} 1e{-5} \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e{-5} \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e{-5} \\ 3594 \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \approx 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 13/15 15/15 #succ 15/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL HMLSL | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\$ | $100 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^*$ | $\begin{array}{c} 1e^{-1} \\ 3.4e5 \\ \textbf{7.3e} \\ 4(0)_{\downarrow 4} \\ \infty \\ \textbf{7.3e} \\ 4(0)_{\downarrow 4} \\ 1e^{-1} \\ 3.1e6 \\ \infty \\ 2 \\ \textbf{1.9}(2) \end{array}$ | 1e-3 6.2e6 ∞ ∞ 1e-3 5.5e6 ∞*4 ∞ | $ \begin{array}{c} 1e-5 \\ \hline 6.7e6 \\ \infty \\ \infty \\ \hline 2e-5 \\ \hline 5.6e6 \\ \infty *4 \\ \infty \\ \infty \\ \infty \\ \end{array} $ | 1e-7 = 6.7e6 = 0.7e6 = 0.7e6 = 0.7e6 = 0.7e6 = 0.7e6 = 0.7e5 | #succ 15/15 0/15 0/15 0/15 #succ 14/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 3 \\ \infty \\ 21 \\ (5) \\ 21 \\ (5) \\ 1 \\ 20 \\ 39 \\ 0.84 \\ (0.2) \\ 13 \\ (1) \\ 0.84 \\ (0.2) \\ 1 \\ 1716 \\ 0.17 \\ (0.0) \\ 1 \\ \end{array}$ | $\begin{array}{c} 1 e 0 \\ \hline 1 e 0 \\ \hline 4274 \\ \hline \infty \\ 77(57) \\ 72(54) \\ \hline 1 e 0 \\ \hline 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e 0 \\ \hline 3102 \\ 4 \ 0.34(0.0) \\ \mu \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_{1} \end{array}$ | $\begin{array}{c} \frac{16-3}{16524} \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \\ 0.40(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} 1e{-}5\\ 16524\\ \infty\\ 118(111)\\ 175(176)\\ 1e{-}5\\ 4371\\ 0.79(0.5)\\ 30(46)\\ 1.0(1)\\ 1e{-}5\\ 3594\\ 4 \ 0.40(0.0)_{12}\\ \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \infty \ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \end{array}$ | $\begin{array}{c} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 2/15 \\ 1/15 \\ \# {\rm succ} \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ \# {\rm succ} \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \end{array}$ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ 1337(554) \\ 1(0) \\ 1 \\ 1 \\ 82 \\ 1.4(0) \\ 36(4) \\ 1.4(0) \\ 1.4(0) \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ $ | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ (0) \\ \hline $ | $\begin{array}{c} 3.4e5 \\ \textbf{7.3e-} \\ \textbf{4}(0) \downarrow \textbf{4} \\ \infty \\ \textbf{7.3e-} \\ \textbf{4}(0) \downarrow \textbf{4} \\ \hline \textbf{1e-1} \\ \hline \textbf{3.1e6} \\ \infty \\ \textbf{2} \\ \textbf{1.9}(2) \\ \hline \textbf{1e-1} \end{array}$ | $ \begin{array}{c} 1e-3 \\ $ | 1e-5 6.7e6 ∞ ∞ 1e-5 5.6e6 ∞*4 ∞ ∞ | 1e-7 = -7 = -7 = -7 = -7 = -7 = -7 = -7 = | #succ 15/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ $\frac{f7}{mLSL}$ $\frac{\Delta f_{opt}}{f8}$ $\frac{\Delta f_{opt}}{f8}$ $\frac{\Delta f_{opt}}{f9}$ $\frac{f9}{mLSL}$ DE | $\begin{array}{c} 1e1\\ 1a51\\ \infty\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow},\\ \infty\end{array}$ | $\begin{array}{c} 1e0\\ 14274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\\ 0.34(0.0) \\ \infty\\ \infty\end{array}$ | $\begin{array}{c} \frac{1e-1}{9503} \\ \hline 9503 \\ \hline \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ \hline 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ \hline 3277 \\ 4 \\ 0.38(0.0) \\ 4 \\ \infty \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \\ 0.40(0.0) \\ \infty \end{array}$ | $\begin{array}{c} \frac{1e-5}{16524} \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ \hline 3594 \\ 4 \\ 0.40(0.0)_{14} \\ \infty \end{array}$ | $\begin{array}{c} 1e-7\\ \hline 16969\\ \infty\ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ \hline 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ \hline 3727\\ \hline 40.40(0.0)_{14}\\ \infty\ 4e5 \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ | 1e1 1 1(0) 1337(554) 1(0) 1e1 82 1.4(0) 36(4) 1.4(0) 1e1 rect | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} 1 \\ 46150 \\ 11 \\ 10 \\ 2.8 \\ 1 \\ 1.6 \\ (0.6)^{\star} \\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 3.4e5 \\ \textbf{7.3e-} \\ 4(0)_{\downarrow 4} \\ \infty \\ 4(0)_{\downarrow 4} \\ 1e-1 \\ 3.1e6 \\ \infty \\ 2 \\ 1.9(2) \\ 1e-1 \\ 1.1e-1 \\ 1e-1 \\ 3.1e6 \\ \infty \\ 2 \\ 1.9(2) \\ 1e-1 \\$ | 1e-3 6.2e6 ∞ ∞ ∞ 1e-3 5.5e6 ∞*4 ∞ ∞ ∞ | 1e-5 6.7e6 ∞ ∞ 1e-5 5.6e6 ∞ *4 ∞ ∞ 1e-5 | $1e-7 = 6$ 6.7e6 ∞ 4e5 ∞ 4e5 1e-7 5.6e6 ∞ 4e5*4 ∞ 4e5 1e-7 1e-7 1e-7 | #succ 15/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{\rm opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f9}$ MLSL DE HMLSL | $\begin{array}{c} 1 \\ 1351 \\ \infty \\ 21(5) \\ 21(5) \\ 1e1 \\ 2039 \\ 0.84(0.2) \\ 13(1) \\ 0.84(0.2) \\ 1e1 \\ 1716 \\ 0.17(0.0)_{\downarrow} \\ \infty \\ 0.17(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} 1 e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1 e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e0 \\ 3102 \\ 4 \ 0.34(0.0)_{\downarrow} \\ \infty \\ 4 \ 0.34(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} \frac{1e-1}{9503} \\ \hline 9503 \\ \hline \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ \hline 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ \hline 3277 \\ 4 \\ 0.38(0.0)_{4} \\ \hline \infty \\ 4 \\ 0.38(0.0)_{1} \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \\ 0.40(0.0)_{\downarrow} \\ \infty \\ 0.40(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} 1e-5\\ 16524\\ \infty\\ \infty\\ 118(111)\\ 175(176)\\ 1e-5\\ 30(46)\\ 1.0(1)\\ 1e-5\\ 3594\\ 4\ 0.40(0.0)_{1/2}\\ \infty\\ 0.40(0.0)_{1/2}\\ 0.40(0.0)_{1/2} \end{array}$ | $\begin{array}{c} 1e-7 \\ 16969 \\ \infty \ 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \infty \ 4e5 \\ 0.40(0.0)_{14} \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ MLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ | $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ 1e0 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1e0 \\ 6541 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $ | $\begin{array}{c} 1 \text{ (e-1)} \\ 3.4 \text{ (e5)} \\ 7.3 \text{ (e-1)} \\ \infty \\ 7.3 \text{ (e-1)} \\ 1 \text{ (e-1)} \\ 3.1 \text{ (e6)} \\ \infty \\ 2 \\ 1.9 (2) \\ 1 \text{ (e-1)} \\ 14103 \\ 1.9 (2) \\ 1 \text{ (e-1)} \\ 14103 \\ 1.9 (2) \\ 1.9$ | 1e-3 6.2e6 ∞ ∞ ∞ 1e-3 5.5e6 ∞^{*4} ∞ 1e-3 14643 20.00(2) | 1e-5 6.7e6 ∞ ∞ ∞ 1e-5 5.6e6 ∞*4 ∞ 1e-5 15567 0.04(0) | 1e-7 6.7e6 $\infty 4e5$ $\infty 4e5$ 1e-7 5.6e6 $\infty 4e5^{*4}$ $\infty 4e5$ 1e-7 17589 0.027(1) | #succ 15/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 #succ 15/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL DE HMLSL | $\begin{array}{c} 1e1\\ 1a51\\ \infty\\ 21(5)\\ 2e1(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1a(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ \end{array}$ | $\begin{array}{c} 1e0 \\ 4274 \\ \hline \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1e0 \\ 3102 \\ 4 \\ 0.34(0.0) \\ \downarrow \\ \infty \\ 4 \\ 0.34(0.0) \\ \downarrow \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0) \\ 1 \\ \infty \\ 4 \\ 0.38(0.0) \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 175(182) \\ 1e-3 \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \ 0.40(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} 1e-5\\ 16524\\ \infty\\ 116524\\ 175(176)\\ 1e-5\\ 4371\\ 0.79(0.5)\\ 30(46)\\ 1.0(1)\\ 1e-5\\ 3594\\ 4\ 0.40(0.0)_{14}\\ \infty\\ 4\ 0.40(0.0)_{14}\\ \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \approx 2z5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 0.40(0.0)_{14}\\ e5\\ 10.40(0.0)_{14}\\ \end{array}$ | $\begin{array}{c} \# {\rm succ} \\ 15/15 \\ 0/15 \\ 2/15 \\ 1/15 \\ \\ \# {\rm succ} \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ 15/15 \\ \end{array}$ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ MLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ 1337(554) \\ 1(0) \\ 1e1 \\ 82 \\ 1.4(0) \\ 36(4) \\ 1.4(0) \\ 1e1 \\ 561 \\ 1.3(2) \\ 1.3(2) \\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ 160 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1c0 \\ 6541 \\ 1.0(0.9) \\ \end{array}$ | $\begin{array}{c} 1 e^{-1} \\ 3.4e5 \\ \textbf{7.3e} \\ \textbf{4}(0)_{\downarrow 4} \\ \infty \\ \textbf{7.3e} \\ \textbf{4}(0)_{\downarrow 4} \\ 1e^{-1} \\ \hline 3.1e6 \\ \infty \\ 2 \\ \textbf{2} \\ \textbf{1.9}(2) \\ \hline 1e^{-1} \\ 14103 \\ \textbf{1.00}(2) \end{array}$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ \infty \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \end{array}$ | $\begin{array}{c} 1e{-}5 \\ 6.7e6 \\ \infty \\ \infty \\ \infty \\ \hline \\ 5.6e6 \\ \infty {}^{+}4 \\ \infty \\ \infty \\ 1e{-}5 \\ 15567 \\ 0.94(2) \\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ 1e-7 \\ \hline \\ 5.6e6 \\ \infty \ 4e5 \\ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ 17589 \\ 0.91(1) \end{array}$ | #succ 15/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 15/15 8/15 8/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1 e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e0 \\ 3102 \\ 4 \\ 0.34(0.0) \\ 1 e0 \\ 1 e0 \\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 1e-1 \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \ 0.40(0.0)_{\downarrow} \\ 0.40(0.0)_{\downarrow} \\ 1e-3 \end{array}$ | $\begin{array}{c} 1e-5\\ 16524\\ \infty\\ \infty\\ 118(111)\\ 175(176)\\ 1e-5\\ 30(46)\\ 1.0(1)\\ 1e-5\\ 3594\\ 4\ 0.40(0.0)_{\downarrow 4}\\ \infty\\ 4\ 0.40(0.0)_{\downarrow 4}\\ 1e-5 \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \infty\ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \infty\ 4e5\\ 10.40(0.0)_{14}\\ 1e-7\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 15/15 15/15 0/15 15/15 4succ 15/15 0/15 15/15 0/15 15/15 0/15 15/15 0/15 15/15 0/15 15/15 0/15 15/15 0/15 15/15 15/15 13/15 15/15 15/15 13/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{*} \\ 1e0 \\ 6541 \\ 1.0(0.9) \\ 94(122) \end{array}$ | $\begin{array}{c} 1 \ 1 \ 1 \ -1 \ \end{array} \\ \hline 1 \ 1 \ -1 \ \end{array} \\ \begin{array}{c} 3.4 \ -5 \ \end{array} \\ \hline 3.4 \ -5 \ \end{array} \\ \begin{array}{c} 7.3 \ -5 \ \end{array} \\ \hline \begin{array}{c} 0 \ \end{array} \\ \end{array} \\ \hline \begin{array}{c} 0 \ \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} 0 \ \end{array} \\ \hline \begin{array}{c} 0 \ \end{array} \\ \hline \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} $ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \hline 5.5e6 \\ \infty {}^{*}4 \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6.7e6\\ \infty\\ \infty\\ \infty\\ 0\\ 1e{-}5\\ 5.6e6\\ \infty^{\star 4}\\ \infty\\ 1e{-}5\\ 15567\\ 0.94(2)\\ 54(65)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \hline \\ 1e-7 \\ \hline \\ 5.6e6 \\ \infty \ 4e5 \\ 4e5 \\ \infty \ 4e5 \\ ec5 \\ 1e-7 \\ 17589 \\ 0.91(1) \\ 48(57) \\ \end{array}$ | #succe 15/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 0/15 15/15 8/15 5/15 |
| $\frac{\Delta f_{\rm opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f8}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f9}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.0.17(0.0)_{\downarrow},\\ \infty\\ 0.17(0.0)_{\downarrow},\\ 1e1\\ 7413\\ \end{array}$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4 \\ 0.34(0.0)\downarrow\\ \infty\\ 4 \\ 0.34(0.0)\downarrow\\ 1e0\\ 88661 \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 665(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \\ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.40(0.0)_{\downarrow} \\ 1e-3 \\ 14920 \end{array}$ | $\begin{array}{c} 1e-5\\ 16524\\ \infty\\ 116524\\ 116524\\ 116524\\ 116524\\ 116524\\ 116524\\ 11752\\ 1102\\ 1002\\ $ | $\begin{array}{c} 1e-7\\ 16969\\ \approx 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{\downarrow 4}\\ e.4e5\\ 10.40(0.0)_{\downarrow 4}\\ 1e-7\\ 17476\end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 | $\frac{\Delta f_{opt}}{\mathbf{f19}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f20}}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{\mathbf{f21}}$ MLSL DE HMLSL DE HMLSL | $\begin{array}{c} 1e1\\ 1\\ 1\\ 1\\ 1(0)\\ 1337(554)\\ 1(0)\\ 1e1\\ 82\\ 1.4(0)\\ 36(4)\\ 1.4(0)\\ 1e1\\ 1.3(2)\\ 62(7)\\ 62(7)\\ 4.2(9) \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1e0 \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \end{array}$ | $\begin{array}{c} 1 e-1 \\ 3.4e5 \\ \textbf{7.3e-} \\ 4(0)_{\downarrow 4} \\ \frac{\infty}{1} \\ e-1 \\ 3.1e6 \\ \frac{\infty}{2} \\ 1.9(2) \\ 1e-1 \\ 14103 \\ 1.00(2) \\ 58(71) \\ 11(15) \end{array}$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e{-}3 \\ 1e{-}3 \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \end{array}$ | $\begin{array}{c} 1e{-}5\\ \hline 6.7e6\\ \infty\\ \infty\\ \hline \\ \infty\\ \infty\\ \hline \\ 0\\ 1e{-}5\\ \hline 5.6e6\\ \infty{+}4\\ \infty\\ \infty\\ \infty\\ \hline \\ 1e{-}5\\ \hline 15567\\ \hline \\ 0.94(2)\\ 54(65)\\ 10(14)\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \end{array}$ $\begin{array}{c} 0.7e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \end{array}$ $\begin{array}{c} 1e-7 \\ 5.6e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \end{array}$ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 15/15 8/15 5/15 7/15 |
| $\begin{array}{c} \Delta f_{\rm opt} \\ \hline f7 \\ MLSL \\ DE \\ HMLSL \\ \Delta f_{\rm opt} \\ \hline f10 \\ MLSL \end{array}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ \end{array}$ | $\begin{array}{c} 1 e0 \\ 1 e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1 e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e0 \\ 3102 \\ 4 \\ 0.34(0.0) \\ 0.34(0.0) \\ 1 \\ e0 \\ 8661 \\ 4 \\ 0.12(0.0) \\ 1 \\ 0.12(0.0) \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 10.11(0.0)_4 \\ 0.11(0.0)_4 \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \\ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.40(0.0)_{\downarrow} \\ 1e-3 \\ 14920 \\ 4 \\ 0.12(0.0)_{\downarrow} \\ 4 \end{array}$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \\ 0.40(0.0)_{\downarrow 4} \\ \infty \\ 4 \\ 0.40(0.0)_{\downarrow 5} \\ 1e-5 \\ 17073 \\ 1 \\ 4 \\ 1650 \end{array}$ | $\begin{array}{l} 1e-7\\ 16969\\ \infty \ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \infty \ 4e5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \infty \ 4e5\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 15/15 0/15 15/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ MLSL DE HMLSL DE HMLSL DE Afont | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \\ \hline \\ & 1(0) \\ \hline \\ & 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ \hline \\ & 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \end{array}$ | $\begin{array}{c} 1 \ 1 \ 1 \ -1 \ \end{array} \\ \hline 1 \ 1 \ -1 \ \end{array} \\ \begin{array}{c} 3.4 \ -5 \ \end{array} \\ \hline 7.3 \ -5 \ -5 \ -5 \ \end{array} \\ \hline 7.3 \ -5 \ -5 \ -5 \ \end{array} \\ \begin{array}{c} \infty \ \end{array} \\ \hline 7.3 \ -5 \ -5 \ \end{array} \\ \begin{array}{c} \infty \ \end{array} \\ \hline 7.3 \ -5 \ \end{array} \\ \begin{array}{c} \infty \ \end{array} \\ \hline 7.3 \ -5 \ \end{array} \\ \begin{array}{c} \infty \ \end{array} \\ \begin{array}{c} \infty \ \end{array} \\ \begin{array}{c} 2 \ \end{array} \\ \begin{array}{c} 2 \ 1.9 \ (2) \ \end{array} \\ \begin{array}{c} 1 \ -1 \ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \begin{array}{c} 1 \ -1 \ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ -1 \ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ -1 \ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} 1 \ \end{array} \\ \end{array}$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \hline 5.5e6 \\ \infty {+}4 \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ \end{array}$ | $\begin{array}{c} 1e{-}5 \\ 6.7e6 \\ \infty \\ \infty \\ \infty \\ \hline \\ 5.6e6 \\ \infty^{*4} \\ \infty \\ 0.94(2) \\ 54(65) \\ 10(14) \\ 1e{-}5 \\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ \hline 5.6e6 \\ \infty \ 4e5 \\ 4e5 \\ 1e-7 \\ 17589 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ \end{array}$ | #succe 15/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 15/15 8/15 5/15 7/15 #succe |
| $\frac{\Delta f_{opt}}{fr}$ MLSL DE HMLSL Δf_{opt} MLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ \infty\end{array}$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ 0.34(0.0)_{\downarrow}\\ 1e0\\ 8661\\ 4\ 0.12(0.0)_{\downarrow},\\ \infty\end{array}$ | $\begin{array}{l} 1e-1\\ 9503\\ \infty\\ 67(63)\\ 65(49)\\ 1e-1\\ 4040\\ 0.79(0.5)\\ 27(50)\\ 1.0(1)\\ 1e-1\\ 3277\\ 4\\ 0.38(0.0)_4\\ 0.38(0.0)_4\\ 1e-1\\ 10735\\ 4\\ 0.11(0.0)_4\\ \infty\end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 116524 \\ 116524 \\ 100000000000000000000000000000000000$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 116524 \\ 165$ | $\begin{array}{l} 1e-7\\ 16969\\ \approx 2 \varepsilon 5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \approx 4 \varepsilon 5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \approx 4 \varepsilon 5\\ 17476\\ \approx 4 \varepsilon 5\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 0/15 15/15 0/15 15/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSI $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL | $\begin{array}{c} 1e1\\ 1\\ 1\\ 1\\ 1(0)\\ 1337(554)\\ 1(0)\\ 1e1\\ 82\\ 1.4(0)\\ 36(4)\\ 1.4(0)\\ 36(4)\\ 1.4(0)\\ 1e1\\ 1.3(2)\\ 62(7)\\ 4.2(9)\\ 1e1\\ 1467\\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 46150 \\ 11 \\ 10 \\ 2.8 \\ 1 \\ 1.6 \\ (0.6)^{\star} \\ 1.6 \\ 0.6541 \\ 1.0 \\ 0.9 \\ 11 \\ 131 \\ 1e0 \\ 5580 \\ \end{array}$ | $\begin{array}{c} 1 \mbox{fe-1} \\ 1 \mbox{3.4e5} \\ 7.3 \mbox{e-} \\ 4(0)_{\downarrow 4} \\ 1 \mbox{e-} \\ 1 \mbox{e-} \\ 3.1 \mbox{e-} \\ \infty \\ 2 \mbox{1.9}(2) \\ 1 \mbox{e-} \\ 1 \mbox{1.9}(2) \\ 1 \mbox{e-} \\ 1 \mbox{1.1}(15) \\ 1 \mbox{1.1}(15) \\ 1 \mbox{e-} \\ 1 \mbox{2.3491} \end{array}$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ 1e{-}3 \\ 1643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6.7e6\\ \infty\\ \infty\\ \infty\\ \infty\\ \infty\\ \infty\\ \infty\\ 1e{-}5\\ 15567\\ 0.94(2)\\ 54(65)\\ 10(14)\\ 1e{-}5\\ 26847\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ e5 \\ \infty \ 4e5 \\ e5 $ | #succe 15/15 0/1 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL Δf_{opt} MLSL DE HMLSL Δf_{opt} f9 MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL MLSL DE HMLSL DE HMLSL DE HMLSL Afopt f9 HMLSL DE HMLSL Afopt f9 HMLSL DE HMLSL Afopt f9 HMLSL DE HMLSL Afopt f9 HMLSL DE HMLSL Afopt f9 HMLSL Afopt f9 HMLSL Afopt f9 HMLSL Afopt f9 HMLSL DE HMLSL Afopt f9 HMLSL Afopt f9 HMLSL | $\begin{array}{c} 1e1\\ 1a51\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow},\\ \infty\\ 0.17(0.0)_{\downarrow},\\ \infty\\ 0.13(0.0)_{\downarrow},\\ \infty\\ 0.13(0.0)_{\downarrow},\\ \infty\\ 0.13(0.0)_{\downarrow},\\ \end{array}$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 8661\\ 4\ 0.12(0.0)_{\downarrow},\\ \infty\\ 0.12(0.0)_{\downarrow},\\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ \infty \\ 0.11(0.0)_4 \\ 0.11(0.0)_4 \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 175(182) \\ 1e-3 \\ 1e-3 \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \ 0.40(0.0)_{\downarrow} \\ 1e-3 \\ 14920 \\ 4 \ 0.12(0.0)_{\downarrow} \\ 0.12(0.0)_{\downarrow} \\ 0.12(0.0)_{\downarrow} \end{array}$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \ 0.40(0.0)_{1/2} \\ \infty \\ 4 \ 0.40(0.0)_{1/2} \\ 1e-5 \\ 17073 \\ 141(50) \\ \infty \\ 4 \ 0.40(50) \end{array}$ | $\begin{array}{l} 1e-7\\ 16969\\ \infty \ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ e-5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \infty \ 4e5\\ \infty \ 4e5\\ \infty \ 4e5\\ \infty \ 4e5\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ MLSL MLSL MLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \hline 5580 \\ 2.4(4) \\ \end{array}$ | $\begin{array}{c} 1 \text{ (e-1)} \\ 3.4 \text{ (e5)} \\ 7.3 \text{ (e7)} \\ 4(0)_{\downarrow 4} \\ \infty \\ 7.3 \text{ (e7)} \\ 4(0)_{\downarrow 4} \\ 1 \text{ (e-1)} \\ 3.1 \text{ (e6)} \\ \infty \\ 2 \\ 1.9(2) \\ 1 \text{ (e-1)} \\ 1.00(2) \\ 58(71) \\ 11(15) \\ 11(15) \\ 1 \text{ (e-1)} \\ 23491 \\ 4.9(5)^{+2} \end{array}$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ \infty \\ 1e{-}3 \\ 14643 \\ 0{-}98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ \end{array}$ | $\begin{array}{c} 1e{-}5 \\ 6.7e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ \infty \\ \infty \\ 1e{-}5 \\ 15567 \\ 0.94(2) \\ 54(65) \\ 10(14) \\ 1e{-}5 \\ 26847 \\ 2 \\ 2 \\ 9 \\ 9 \\ 0 \\ 0 \\ 1 \\ 2 \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ e5 $ | #succ 15/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL | $\begin{array}{c} 1e1\\ 1a51\\ \infty\\ 0.1a, 0.2a, 0.2$ | $\begin{array}{c} 1e0 \\ 1e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1e0 \\ 3102 \\ 4 \\ 0.34(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.34(0.0)_{\downarrow} \\ 0.3661 \\ 4 \\ 0.12(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.12(0.0)_{\downarrow} \\ 1e0 \\ 1e0 \\ 8661 \\ 1e0 \\ 1e$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ \infty \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ 1e-1 \\ 1e-1 \\ 10735 \\ 1e-1 \\ 1e-1 \\ 10735 \\ 1e-1 \\ 1e-1 \\ 10735 \\ 1e-1 \\ $ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 100000000000000000000000000000000000$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1652 \\ 17073 \\ 1652 \\ 17073 \\ 1652 \\ 17073 \\ 141(50) \\ 1655 \\ 1555 \\ 15$ | $\begin{array}{l} 1e-7\\ 16969\\ \approx 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \approx 4e5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \approx 4e5\\ \infty 4e5\\ \infty 4e5\\ \infty 4e5\\ 1e-7\end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE DE DE | $\begin{array}{c} 1e1\\ 1\\ 1\\ 1\\ 1\\ 1(0)\\ 1337(554)\\ 1(0)\\ 1e1\\ 82\\ 1.4(0)\\ 36(4)\\ 1.4(0)\\ 1e1\\ 561\\ 1.3(2)\\ 62(7)\\ 4.2(9)\\ 1e1\\ 467\\ 8.2(4)\\ 584(550)\\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\$ | $\begin{array}{c} 1 \mbox{fe}{} 1 f$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ 4.1(4)^{*} \\ \end{array}$ | $\begin{array}{c} 1e{-5} \\ 6.7e6 \\ \infty \\ $ | $1e-7 \\ 6.7e6 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 5.6e6 \\ \infty 4e5 \\ 4e5 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 17589 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ 1.3e5 \\ 0.82(0.8) \\ \infty 4e5 \\ 0.82(0.8) \\ 0.82($ | #succ 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 5/15 5/15 5/15 12/15 #succ 12/15 *25/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE MLSL $\frac{\Delta f_{opt}}{f8}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ | $\begin{array}{c} 1e1\\ 1a51\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow},\\ \infty\\ 0.17(0.0)_{\downarrow},\\ 0.13(0.0)_{\downarrow},\\ \infty\\ 0.13(0.0)_{\downarrow},\\ \infty\\ 0.13(0.0)_{\downarrow},\\ 1e1\\ 10002\\ 1000$ | $\begin{array}{c} 1e0 \\ 1e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1e0 \\ 3102 \\ 4 \\ 0.34(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.34(0.0)_{\downarrow} \\ 0.34(0.0)_$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 0.11(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.11(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.28(0.0)_{\downarrow} \\ 0.28(0.0)_{\downarrow}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 165$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1652 \\ 10001 \\ 100001 \\ 100001 \\ 100001 \\ 100001 \\ 1000000 \\ 1000000 \\ 1000000 \\ 10000000 \\ 1000000 \\ 10000000 \\ 10000000 \\ 100000000$ | $\begin{array}{c} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ e45 \\ 10.40(0.0)_{14} \\ 1e-7 \\ 17476 \\ e4e5 \\ e4e5 \\ e4e5 \\ e4e5 \\ 1e-7 \\ 14921 \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 13/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 15/1 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f20}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f21}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL | $\begin{array}{c} 1e1 \\ 1 \\ 1 \\ 1 \\ 1(0) \\ 1337(554) \\ 1(0) \\ 1e1 \\ 82 \\ 1.4(0) \\ 36(4) \\ 1.4(0) \\ 1e1 \\ 1.3(2) \\ 62(7) \\ 4.2(9) \\ 1e1 \\ 467 \\ 3.2(4) \\ 584(859) \\ 140(229) \\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 1(0) \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 64(108) \end{array}$ | $\begin{array}{c} 1e-1 \\ 3.4e5 \\ \textbf{7.3e-} \\ 4(0)_{\downarrow4} \\ \infty \\ \textbf{7.3e-} \\ 4(0)_{\downarrow4} \\ 1e-1 \\ 3.1e6 \\ \infty \\ 2 \\ \textbf{1.9}(2) \\ 1e-1 \\ 14103 \\ \textbf{1.00}(2) \\ 58(71) \\ 11(15) \\ 1e-1 \\ 23491 \\ \textbf{4.3}(5)^{*2} \\ \textbf{x} \\ \textbf{x} \\ \textbf{x} \\ \textbf{11}(128) \end{array}$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \hline \\ \infty \\ \infty \\ \hline \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ \hline \\ 4.1(4)^{\star} \\ \infty \\ 105(128) \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6.7e6\\ \infty\\ \infty\\ \infty\\ \end{array}\\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$ | $1e-7$ 6.7e6 ∞ 4e5 ∞ 4e5 $1e-7$ 5.6e6 ∞ 4e5 $4e5$ ∞ 4e5 $1e-7$ 1.7589 0.91(1) 48(57) 9.3(12) 1e-7 1.3e5 0.82(0.8) ∞ 4e5 $42(45)$ | #succ 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 5/15 5/15 5/15 7/15 *25/15 0/25/15 0/15 |
| $\frac{\Delta f_{opt}}{f7}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f9}$ MLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ MLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL $\frac{\Delta f_{opt}}{f10}$ HMLSL | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 0\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 10\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 10\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.34(0.0)_{\downarrow}\\ 1e0\\ 8661\\ 4\ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 1e0\\ 2228\\ 0.40(0.0)\\ 2100\\ 0.10(0.0)\\ 1e0\\ 0.10$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ 0.11(0.0)_4 \\ 1e-1 \\ 6278 \\ 0.04(0.5) \\ 1e-1 \\ 6278 \\ 0.04(0.5) \\ 1e-1 \\ $ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 100000000000000000000000000000000000$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \\ 0.40(0.0)_{14} \\ \infty \\ 4 \\ 0.40(0.0)_{14} \\ 1e-5 \\ 17073 \\ 1 \\ 4 \\ 41(50) \\ \infty \\ 1e-5 \\ 12285 \\ 12285 \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \infty \ 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ \infty \ 4e5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \infty \ 4e5\\ \infty \ 4e5\\ \infty \ 4e5\\ 1e-7\\ 14831\\ 1e-7\\ 14831\\ 1e-7\end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL $\frac{\Delta f_{opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL $\frac{\Delta f_{opt}}{f21}$ MLSL DE HMLSL DE HMLSL DE HMLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \\ \end{array} \\ \begin{array}{c} \infty \\ 1(0) \\ \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ 1e0 \\ \hline 5580 \\ \begin{array}{c} 3.4(4) \\ 200(251) \\ 64(108) \end{array}$ | $\begin{array}{c} 1 \mbox{fe}{} 1 f$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ 5.5e6 \\ \infty {*}4 \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ 4.1(4){*} \\ \infty \\ 105(128) \end{array}$ | $\begin{array}{c} 1e{-}5 \\ \hline 6.7e6 \\ \infty \\ \infty \\ \hline \infty \\ \hline \\ \infty \\ \hline \\ \infty \\ \hline \\ 5.6e6 \\ \infty *4 \\ \infty \\ \hline \\ \infty \\ 1e{-}5 \\ \hline 15567 \\ 0.94(2) \\ 54(65) \\ 10(14) \\ 1e{-}5 \\ \hline \\ 26847 \\ 2 \\ 3.8(4) *2 \\ \hline \\ \infty \\ 97(112) \\ \end{array}$ | $\begin{array}{l} 1e+7\\ 6.7e6\\ \infty \ 4e5\\ \infty \ 4e5\\ 1e-7\\ 1.5e6\\ \infty \ 4e5\\ 4e5\\ 1e-7\\ 17589\\ 0.91(1)\\ 48(57)\\ 9.3(12)\\ 1e-7\\ 1.3e5\\ 0.82(0.8)\\ \infty \ 4e5\\ 42(45)\\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 15/15 8/15 5/15 7/15 #succ 12/15 *25/15 0/15 1/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{fr}{mLSL}$ DE $\frac{\Delta f_{opt}}{f8}$ $\frac{\Delta f_{opt}}{f8}$ $MLSL$ DE $HMLSL$ DE $HMLSL$ $\frac{\Delta f_{opt}}{f10}$ $MLSL$ DE $HMLSL$ DE $\frac{\Delta f_{opt}}{f11}$ $\frac{\Delta f_{opt}}{f11}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 0.12\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ \end{array}$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4 \ 0.34(0.0)\downarrow\\ \infty\\ 4 \ 0.34(0.0)\downarrow\\ 0.34(0.0)\downarrow\\ 0.34(0.0)\downarrow\\ 0.34(0.0)\downarrow\\ 1e0\\ 8661\\ 4 \ 0.12(0.0)\downarrow\\ 0.12(0.0)\downarrow\\ 1e0\\ 2228\\ 4 \ 0.10(0.0)\downarrow \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ 0.38(0.0)_4 \\ 0.38(0.0)_4 \\ 0.38(0.0)_4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ 1e-1 \\ 6278 \\ 4 \\ 0.04(9e-3) \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 105$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 116524 \\ 11652 \\ 11$ | $\begin{array}{c} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \approx 4e5 \\ 10.40(0.0)_{14} \\ e-5 \\ 17476 \\ \approx 4e5 \\ e-7 \\ 14831 \\ e-7 \\ 14831 \\ e-5 \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/ | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE MLSL DE MLSL DE MLSL DE MLSL DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1.6(0.6)^{\star} \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \hline 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ \end{array}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ \infty \\ 1e{-}3 \\ 1e{-$ | $\begin{array}{c} 1e{-}5\\ \hline 6.7e6\\ \infty\\ \infty\\ \hline \\ \infty\\ \infty\\ \hline \\ \infty\\ \infty\\ \hline \\ 0.94(2)\\ 54(65)\\ 10(14)\\ 1e{-}5\\ 10(14)\\ 1e{-}5\\ \hline \\ 3.8(4)^{*}2\\ \hline \\ \\ \infty\\ 97(112)\\ 1e{-}5\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ ec \\ \infty \ 4e5 \\ ec \\ \infty \ 4e5 \\ ec \\ ec \\ \infty \ 4e5 \\ ec \\ ec \\ ec \\ ne-7 \\ 1.3e5 \\ 0.82(0.8) \\ \infty \ 4e5 \\ 42(45) \\ 1e-7 \\ 1.3e5 \\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 15/15 8/15 5/15 7/15 #succ 12/15 *25/15 0/15 #succ 1/2/15 1/15 #succ 1/2/15 1/15 1/15 1/15 #succ 1/2/15 1/15 1/15 #succ 1/2/15 1/15 1/15 #succ 1/2/15 1/15 1/2/15 1/2/15 1/15 1/2/ |
| $\frac{\Delta f_{opt}}{f7}$ $\frac{\Delta f_{opt}}{R}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 0.16(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 0.16(0.0)_{\downarrow}\\ 0.16(0.$ | $\begin{array}{c} 1 e0 \\ 1 e0 \\ 4274 \\ \infty \\ 77(57) \\ 72(54) \\ 1 e0 \\ 3871 \\ 0.78(0.5) \\ 27(52) \\ 1.0(1) \\ 1 e0 \\ 3102 \\ 4 \ 0.34(0.0) \\ 0.34(0.0) \\ 0.34(0.0) \\ 0.34(0.0) \\ 0.12(0.0) \\ 0.12(0.0) \\ 1 e0 \\ 2228 \\ 4 \ 0.12(0.0) \\ 1 e0 \\ 2228 \\ 4 \ 0.10(0.0) \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 10735 \\ 4 \\ 0.11(0.0)_{\downarrow} \\ \infty \\ 4 \\ 0.11(0.0)_{\downarrow} \\ 1e-1 \\ 6278 \\ 4 \\ 0.04(9e-3 \\ \infty \\ 0.04(9e-3 \\ 0.0$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 105$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \ 0.40(0.0)_{12} \\ \infty \\ 4 \ 0.40(0.0)_{14} \\ \infty \\ 1e-5 \\ 17073 \\ 4 \ 41(50) \\ \infty \\ 1e-5 \\ 12285 \\ \infty \\ \infty \\ \infty \end{array}$ | $\begin{array}{c} 1e-7\\ 16969\\ \approx 2 \varepsilon 5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ e-5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \infty 4 \varepsilon 5\\ \infty 4 \varepsilon 5\\ \infty 4 \varepsilon 5\\ 1e-7\\ 14831\\ \infty 4 \varepsilon 5\\ 1e-7\\ 14831\\ \infty 4 \varepsilon 5\\ \infty 4 \varepsilon 5\\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSL $\frac{\Delta f_{\rm opt}}{f20}$ MLSL DE HMLSL DE HMLSL DE HMLSL DE MLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE HMLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ \end{array}$ | $\begin{array}{c} 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 $ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \hline \\ \infty \\ \infty \\ 1e{-}3 \\ \hline 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ \hline 4.1(4)^{\star} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6.7e6\\ \infty\\ \infty\\ \end{array}\\ \begin{array}{c} \\\infty\\ \\\infty\\ \end{array}\\ \begin{array}{c} \\\infty\\ \\\infty\\ \\\infty\\ \end{array}\\ \begin{array}{c} \\\infty\\ \\\infty\\ \\0.94(2)\\ 54(65)\\ 10(14)\\ 1e{-}5\\ 26847\\ 2\\ 3.8(4)^{*}2\\ \\ \\\infty\\ 97(112)\\ 1e{-}5\\ \\8.1e5\\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ e5 $ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 15/15 12/15 *25/15 0/15 1/15 #succc 15/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{fl0}$ $\frac{\Delta f_{opt}}{fl0}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl1}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 0\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 10(1)\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ \infty\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.0.17(0.0)_{\downarrow}\\ 0.0.17(0.0)_$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)\downarrow\\ 1e0\\ 8661\\ 4\ 0.12(0.0)\downarrow\\ 1e0\\ 8661\\ 4\ 0.12(0.0)\downarrow\\ 1e0\\ 2228\\ 4\ 0.10(0.0)\downarrow\\ \infty\\ 4\ 0.10(0.0)\downarrow\\ 0\\ 2228\\ 4\ 0.10(0.0)\downarrow\\ 0\\ 10\\ 0\\ 20\\ 24\\ 0\\ 10\\ 0\\ 10\\ 0\\ 0\\ 10\\ 0\\ 0\\ 0\\ 0\\ 10\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_{\downarrow} \\ \infty \\ 1e-1 \\ 6278 \\ 4 \\ 0.04(9e-3) \\ \infty \\ 4 \\ 0.04(9e-3) \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 165$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1652 \\ 100000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 1000$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \infty 4e5 \\ 1e-7 \\ 17476 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ \infty 4e5 \\ \infty 4e5 \\ \infty 4e5 \\ \infty 4e5 \\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSI $\frac{\Delta f_{\rm opt}}{f20}$ MLSL DE HMLSI DE HMLSI DE HMLSL DE HMLSL DE HMLSL DE HMLSL DE $\frac{\Delta f_{\rm opt}}{f22}$ MLSL DE MLSL MLSL MLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} 1 \\ 46150 \\ 11 \\ 10 \\ 2.8 \\ 1 \\ 1.6 \\ 0.6 \\ 1 \\ 1.0 \\ 0.9 \\ 4 \\ 122 \\ 11 \\ 131 \\ 1e0 \\ \hline 5580 \\ 3.4 \\ 4 \\ 100 \\ (251) \\ 64 \\ 108 \\ 1e0 \\ 1614 \\ 3.4 \\ (3) \end{array}$ | $\begin{array}{c} 1 \mbox{ferred} 1 \mbox{ferred} 1 \mbox{set} 1 \mb$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} 1e{-}3 \\ 105(128) \\ 1e{-}3 \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \end{array}$ | $\begin{array}{c} 1e{-5} \\ \hline 6.7e6 \\ \infty \\ \hline \\ \infty \\ \hline \\ \infty \\ \infty \\ \hline \\ \infty \\ \hline \\ \infty \\ \infty$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \end{array} \\ \begin{array}{c} 6.7e6 \\ \infty \ 4e5 \\ \end{array} \\ \begin{array}{c} e-7 \\ 1e-7 \\ 17589 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ 1.3e5 \\ 0.82(0.8) \\ \infty \ 4e5 \\ 42(45) \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 8/15 5/15 8/15 5/15 1/2/15 0/15 0/15 1/15 8/15 5/15 1/ |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e1\\ 1e$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)\downarrow\\ \infty\\ 4\ 0.34(0.0)\downarrow\\ 1e0\\ 8661\\ 4\ 0.12(0.0)\downarrow\\ \infty\\ 4\ 0.12(0.0)\downarrow\\ 1e0\\ 2228\\ 4\ 0.10(0.0)\downarrow\\ 0.10(0.0)\downarrow\\ 1e0\\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ \infty \\ 4 \\ 0.04(9e-3 \\ 4 \\ 0.04(9e-3 \\ 1e-1 \\ 1e$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16526 \\ 16526 \\ 16526 \\ 10000 \\ 100$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \ 0.40(0.0)_{42} \\ \infty \\ 4 \ 0.40(0.0)_{44} \\ 1e-5 \\ 17073 \\ 141(50) \\ 1e-5 \\ 12285 \\ \infty \\ \infty \\ \infty \\ 1e-5 \end{array}$ | $\begin{array}{l} 1e-7\\ 16969\\ \approx 2e5\\ 115(119)\\ 343(395)\\ 1e-7\\ 4484\\ 0.78(0.5)\\ 32(45)\\ 0.99(1)\\ 1e-7\\ 3727\\ 10.40(0.0)_{14}\\ e-5\\ 10.40(0.0)_{14}\\ 1e-7\\ 17476\\ \approx 4e5\\ e4e5\\ e4e5\\ 1e-7\\ 14831\\ \approx 4e5\\ e5\\ e4e5\\ 1e-7\\ 1e-7$ | #succ 15/15 15/15 2/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSL DE | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 160 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ \hline 160 \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ 3.4(3) \\ \infty \end{array}$ | $\begin{array}{c} 1 \mbox{field} & 1 \mbox{field} \\ 1 \mbox{field} & 3.4 \mbox{field} \\ 5 \mbox{field} & 7.3 \mbox{e-} \\ 4 \mbox{(0)}_{44} & 1 \mbox{e-} 1 \\ \hline 3.1 \mbox{field} & 3.1 \mbox{field} \\ \hline \infty & 2 \\ 1.9 \mbox{(2)} \\ 1.00 \mbox{(2)} \\ 5 \mbox{field} & 1.00 \mbox{(2)} \\ 11 \mbox{(123)} \\ 11 \mbox{(123)} \\ 1 \mbox{field} & 1.0 \mbox{field} \\ 11 \mbox{field} & 1.0 \mbox{field} & 1.0 \mbox{field} \\ 11 \mbox{field} & 1.0 \mbox{field}$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \hline \infty \\ \infty \\ \hline 0.98 \\ 1e{-}3 \\ \hline 14643 \\ 0.98 \\ (2) \\ 56 \\ 68 \\ 11 \\ (15) \\ 1e{-}3 \\ 24948 \\ \hline 4.1 \\ (4)^{*} \\ \hline \infty \\ 105 \\ (128) \\ 1e{-}3 \\ \hline 4.9e5 \\ \infty \\ \infty \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6{-}7e6\\ \infty\\ \infty\\ \end{array}\\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ e5 \\ e5 \\ 4e5 \\ e5 \\ e5 \\ e5 \\ e5$ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 #succ 15/15 *25/15 0/15 1/15 #succ 15/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{ft0}$ $\frac{\Delta f_{opt}}{ft1}$ $\frac{\Delta f_{opt}}{ft1}$ $\frac{\Delta f_{opt}}{ft1}$ $\frac{\Delta f_{opt}}{ft1}$ $\frac{\Delta f_{opt}}{ft1}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 10(1)\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 10042\\ \end{array}$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.34(0.0)_{\downarrow}\\ 1e0\\ 8661\\ 4\ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 1e0\\ 2228\\ 4\ 0.10(0.0)_{\downarrow}\\ \infty\\ 4\ 0.10(0.0)_{\downarrow}\\ 1e0\\ 1038\\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ \infty \\ 1e-1 \\ 10735 \\ 4 \\ 0.04(9e-3 \\ \infty \\ 4 \\ 0.04(9e-3 \\ \infty \\ 1e-1 \\ 2740 \\ \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1052$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1652 \\ 17073 \\ 1000 \\$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \approx 4e5 \\ 10.40(0.0)_{14} \\ 1e-7 \\ 17476 \\ \approx 4e5 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 13897 \\ \end{array}$ | #succ 15/15 2/15 1/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL HMLSL HMLSL | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \\ \hline \\ 0 \\ 1(0) \\ \hline \\ 100 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1e0 \\ \hline \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \hline \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ 3.4(3) \\ \\ \\ \mathbf{\infty} \\ 6.4(5) \\ \end{array}$ | $\begin{array}{c} 1 \mbox{fe-1} \\ 3.4 \mbox{fe-1} \\ 3.4 \mbox{fe-1} \\ -3.4 \mbox{fe-1} \\ -3.1 $ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ \hline 4.1(4)^{\star} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ | $\begin{array}{c} 1e{-5} \\ \hline 6.7e6 \\ \infty \\ \hline \\ 0 \\ 1e{-5} \\ \hline 15567 \\ 0.94(2) \\ 54(65) \\ 10(14) \\ 1e{-5} \\ 26847 \\ 2 \\ \hline \\ 26847 \\ 2 \\ \hline \\ 3.8(4)^{*2} \\ \hline \\ \\ \infty \\ \infty \\ \hline \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ | $\begin{array}{c} 1e+7\\ 6.7e6\\ \infty \ 4e5\\ \infty \ 4e5\\ \end{array}$ $\begin{array}{c} 1e-7\\ 5.6e6\\ \infty \ 4e5\\ \infty \ 4e5\\ \infty \ 4e5\\ 1e-7\\ 17589\\ 0.91(1)\\ 48(57)\\ 9.3(12)\\ 1e-7\\ 1.3e5\\ 0.82(0.8)\\ \infty \ 4e5\\ 42(45)\\ 1e-7\\ 8.4e5\\ \infty \ 4e5\\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 0/15 14/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 15/15 \$ 5/15 7/15 #succ 12/15 1/15 15/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{MLSL}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{RLSL}$ $\frac{\Delta f_{opt}}{RLSL}$ $\frac{\Delta f_{opt}}{RLSL}$ $\frac{\Delta f_{opt}}{RLSL}$ $\frac{\Delta f_{opt}}{RLSL}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 1e1\\ 2039\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 1e1\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 0.17(0.0)_{\downarrow}\\ 0.17(0.0)$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4 \ 0.34(0.0)_{\downarrow}\\ 0.34(0.0)_{\downarrow}\\ 0.34(0.0)_{\downarrow}\\ 0.34(0.0)_{\downarrow}\\ 1e0\\ 8661\\ 4 \ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 1e0\\ 1938\\ 0.10(0.0)_{\downarrow}\\ 1e0\\ 1938\\ 0.0 \ 89(0)\\ 1938\\ 0.0 \ 89(0)\\ 0.0 \$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ 1e-1 \\ 10735 \\ 10.11(0.0)_4 \\ \infty \\ 4 \\ 0.04(9e-3 \\ 1e-1 \\ 2740 \\ 3) \\ 0.88(0) \\ 0.88$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 118(121) \\ 175(182) \\ 1e-3 \\ 4219 \\ 0.79(0.5) \\ 29(48) \\ 1.0(1) \\ 1e-3 \\ 3455 \\ 4 \ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \ 0.40(0.0)_{\downarrow} \\ \infty \\ 4 \ 0.40(0.0)_{\downarrow} \\ 0.12(0.0)_{\downarrow} \\ 4 \\ 0.12(0.0)_{\downarrow} \\ 0.12(0.0)_{\downarrow} \\ \frac{1e-3}{9762} \\ 0.12(0.0)_{\downarrow} \\ 1e-3 \\ \frac{1e-3}{9762} \\ 0.12(0.0)_{\downarrow} \\ 1e-3 \\ 0.12(0.0)_{\downarrow} \\ 1$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \\ 0.40(0.0)_{14} \\ \infty \\ 4 \\ 0.40(0.0)_{14} \\ \infty \\ 4 \\ 0.40(0.0)_{14} \\ 1e-5 \\ 12285 \\ \infty \\ \infty \\ 1e-5 \\ 12407 \\ 1e-5 \\ 12407 \\ 12407 \\ 10, 88(0.5) \\ 10$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \approx 4e5 \\ 10.40(0.0)_{14} \\ 1e-7 \\ 17476 \\ \approx 4e5 \\ 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ 1e-7 \\ 13827 \\ 1e-7 \\ 11(15) \\ 15 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$ | #succ 15/15 0/15 2/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/155 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSI $\frac{\Delta f_{\rm opt}}{f20}$ MLSL DE HMLSI DE HMLSI $\frac{\Delta f_{\rm opt}}{f21}$ MLSL DE HMLSI $\frac{\Delta f_{\rm opt}}{f22}$ MLSL DE HMLSI $\frac{\Delta f_{\rm opt}}{f23}$ MLSL DE HMLSI $\Delta f_{\rm opt}$ $\frac{\Delta f_{\rm opt}}{f23}$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 100 \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1e0 \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ 3.4(3) \\ \infty \\ 6.4(5) \\ 1e0 \\ \end{array}$ | $\begin{array}{c} 1 \mbox{fe}{-1} \\ 3.4 \mbox{fe}{-5} \\ 7.3 \mbox{e}{-4} \mbox{(0)}_{\downarrow 4} \\ \infty \\ 7.3 \mbox{e}{-4} \mbox{(0)}_{\downarrow 4} \\ 1 \mbox{e}{-1} \\ 3.1 \mbox{e}{-6} \\ \infty \\ 2 \mbox{1.9} \mbox{(2)}_{2} \\ 1.9 \mbox{(2)}_{2} \\ 1.9 \mbox{(2)}_{2} \\ 1.9 \mbox{(2)}_{2} \\ 1.9 \mbox{(2)}_{2} \\ 1.0 \mb$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} \infty \\ \infty \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(8) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ 4.1(4)^{\star} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ \infty \\ 1e{-}3 \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ \hline 6.7e6\\ \infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\0.94(2)\\ 1e{-}5\\ \hline 0.94(2)\\ 10(14)\\ 1e{-}5\\ \hline 2.86847\\ 2.86847\\ 2.86847\\ \hline 3.8(4){+}2\\ \\\infty\\ 97(112)\\ 1e{-}5\\ \hline 8.1e5\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\\infty\\ \\$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ 0.82(0.8) \\ 0.82(0.8) \\ \hline \\ \infty \ 4e5 \\ 42(45) \\ 1e-7 \\ \hline \\ 8.4e5 \\ \infty \ 4e5 \\ \infty \ $ | #succ 15/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 15/15 0/15 15/15 0/15 12/15 *25/15 0/15 1/15 0/155 0/155 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{f_{0}}{fr}$ $\frac{\Delta f_{opt}}{fl0}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl2}$ $\frac{\Delta f_{opt}}{fl1}$ $\frac{\Delta f_{opt}}{fl2}$ $\frac{\Delta f_{opt}}{fl2}$ $\frac{\Delta f_{opt}}{fl2}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 31(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 10(1)\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.6\\ 0.81(0.6\\ 0.6\\ 0.6\\ 0.81(0.6\\ 0.81(0.81(0.6\\ 0.81(0.81(0.81(0.81(0.81(0.81(0.81(0.81($ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.12(0.0)_{\downarrow}\\ 0.12(0.0)_{\downarrow}\\ 1e0\\ 2228\\ 4\ 0.10(0.0)_{\downarrow}\\ \infty\\ 4\ 0.10(0.0)_{\downarrow}\\ 1e0\\ 1938\\ 0.9, 0.89(0.1)\\ 235(310)\\ \end{array}$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 4 \\ 0.38(0.0)_4 \\ \infty \\ 1e-1 \\ 10735 \\ 4 \\ 0.11(0.0)_4 \\ \infty \\ 1e-1 \\ 10735 \\ 4 \\ 0.04(9e-3) \\ \infty \\ 4 \\ 0.04(9e-3) \\ \infty \\ 1e-1 \\ 2740 \\ 5) \\ 0.88(11) \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 16524 \\ 1652$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1000 \\$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 1 \\ 0.40(0.0)_{14} \\ \approx 4e5 \\ 1 \\ 0.40(0.0)_{14} \\ 1e-7 \\ 17476 \\ \approx 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ \infty 4e5 \\ 1e-7 \\ 13827 \\ 11(15) \\ \infty (e5 \\ \end{array}$ | #succ 15/15 0/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 15/15 0/15 15/15 0/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL HMLSL DE HMLSL H | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \\ \hline \\ 1(0) \\ 1(0) \\ \hline \\ 46150 \\ 11(10) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ 1e0 \\ \hline \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \hline \\ 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ 3.4(3) \\ \\ \\ \infty \\ 6.4(5) \\ 1e0 \\ \hline \\ \end{array}$ | $\begin{array}{c} 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 $ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ 4.1(4)^{\star} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e{-}3 \\$ | $\begin{array}{c} 1e{-5} \\ 6.7e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e{-5} \\ 15567 \\ 0.94(2) \\ 54(65) \\ 10(14) \\ 1e{-5} \\ 26847 \\ 2 \\ 3.8(4)^{*2} \\ \infty \\ 97(112) \\ 1e{-5} \\ 8.1e5 \\ \infty \\ \infty \\ \infty \\ 1e{-5} \\ 5 \\ 2.5 \\ \infty \\ \infty \\ \infty \\ \infty \\ 1e{-5} \\ 5 \\ 2.5 \\ 0 \\ 1e{-5} \\ 5 \\ 0 \\ 1e{-5} \\ $ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \end{array}$ $\begin{array}{c} e-7 \\ 5.6e6 \\ \infty \ 4e5 \\ e-7 \\ 17589 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ 1.3e5 \\ 0.82(0.8) \\ \alpha \ 4e5 \\ 42(45) \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ \infty $ | #succ 15/15 0/15 0/15 0/15 14/15 0/15 14/15 0/15 15/15 0/15 14/15 0/15 15/15 8/15 5/15 5/15 12/15 #succ 12/15 0/15 #succ 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{MLSL}{DE}$ $\frac{MLSL}{MLSL}$ $\frac{\Delta f_{opt}}{f8}$ $\frac{MLSL}{f10}$ $\frac{MLSL}{f10}$ $\frac{\Delta f_{opt}}{f11}$ $\frac{MLSL}{DE}$ $\frac{\Delta f_{opt}}{f11}$ $\frac{\Delta f_{opt}}{f11}$ $\frac{\Delta f_{opt}}{f12}$ $\frac{MLSL}{MLSL}$ $\frac{MLSL}{DE}$ $\frac{MLSL}{DE}$ $\frac{MLSL}{MLSL}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 10, 10, 10\\ 10, 10\\ 10, 10\\ 10, 10\\ 10, 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 1.0(1)\\ 1e0\\ 3102\\ 4\\ 0.34(0.0)\downarrow\\ 1e0\\ 8661\\ 4\\ 0.12(0.0)\downarrow\\ 1e0\\ 8661\\ 4\\ 0.12(0.0)\downarrow\\ 0.89(0.0)\downarrow\\ 2228\\ 4\\ 0.10(0.0)\downarrow\\ 1e0\\ 2228\\ 4\\ 0.10(0.0)\downarrow\\ 1e0\\ 2228\\ 4\\ 0.10(0.0)\downarrow\\ 0.89(0.0)\downarrow\\ 1e0\\ 1938\\ 0.89(0.0)\downarrow\\ 0.89(0.0)\downarrow\\$ | $\begin{array}{c} 1e-1 \\ 9503 \\ \infty \\ 67(63) \\ 65(49) \\ 1e-1 \\ 4040 \\ 0.79(0.5) \\ 27(50) \\ 1.0(1) \\ 1e-1 \\ 3277 \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 1e-1 \\ 10735 \\ 4 \\ 0.38(0.0)_{\downarrow} \\ 1e-1 \\ 6278 \\ 4 \\ 0.04(9e-3) \\ \infty \\ 4 \\ 0.04(9e-3) \\ 1e-1 \\ 2740 \\ 3) \\ 0.83(\\ 1028(111 \\ 0.084(1000) \\ 10000 $ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16526 \\ 1862$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \\ 0.40(0.0)_{14} \\ 4 \\ 0.40(0.0)_{14} \\ 4 \\ 0.40(0.0)_{14} \\ 1e-5 \\ 17073 \\ 141(50) \\ 1e-5 \\ 12285 \\ \infty \\ 12285 \\ \infty \\ 12407 \\ 4 \\ 0.58(0.5) \\ \infty \\ 0 \\ 8 \\ 8 \\ 16 \\ 0 \\ 8 \\ 8 \\ 16 \\ 16 \\ 16 \\ 12407 \\ 16 \\ 12407 \\ 16 \\ 12407 \\ 16 \\ 12407 \\ 16 \\ 12407 \\ 10 \\ 16 \\ 12407 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ $ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \approx 4e5 \\ 0.40(0.0)_{14} \\ e-5 \\ 1e-7 \\ 17476 \\ e 4e5 \\ e-5 \\ 1e-7 \\ 14831 \\ e 4e5 \\ e 4e5 \\ 1e-7 \\ 14831 \\ e 4e5 \\ e 4e5 \\ 1e-7 \\ 13827 \\ 1e-7 \\ 14831 \\ e 4e5 \\ 1e-7 \\ 14831 \\ e 4e5 \\ e 4e5 \\ e 4e5 \\ 1e-7 \\ 14831 \\ e 4e5 \\ e 4e5 \\ e 4e5 \\ 1e-7 \\ 14831 \\ e 4e5 \\ e 4e$ | #succ 15/15 2/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 0 | $\frac{\Delta f_{\rm opt}}{f19}$ MLSL DE HMLSI HM | $\begin{array}{c} 1e1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1$ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\$ | $\begin{array}{c} 1 \mbox{fe}{-1} \\ 3.4 \mbox{fe}{-5} \\ 3.4 \mbox{fe}{-5} \\ 7.3 \mbox{e}{-4} \mbox{(0)}_{14} \\ 1 \mbox{e}{-1} \\ 3.1 \mbox{e}{-6} \\ 2 \mbox{1.9} \mbox{(2)}_{14} \\ 1 \mbox{e}{-1} \\ 3.1 \mbox{e}{-6} \\ \infty \\ 2 \mbox{1.9} \mbox{(2)}_{14} \\ 1 \mbox{e}{-1} \\ 13.1 \mbox{e}{-1} \\ 234 \mbox{e}{-1} \\ 111 \mbox{(1)}_{23491} \\ 4.3 \mbox{(5)}^{*2} \\ \infty \\ 1111 \mbox{(128)} \\ 1 \mbox{e}{-1} \\ 674 \mbox{f}{-7} \\ 25 \mbox{(30)} \\ \infty \\ 86 \mbox{(93)} \\ 1 \mbox{e}{-1} \\ 5.2 \mbox{e}{-7} \\ \end{array}$ | $\begin{array}{c} 1e{-}3 \\ 6.2e6 \\ \infty \\ \infty \\ \infty \\ \end{array} \\ \begin{array}{c} \infty \\ \infty \\ \infty \\ 1e{-}3 \\ 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ 4.1(4)^{\star} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ 1e{-}3 \\ 1e{-}3 \\ 5.2e7 \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ \hline 6.7e6\\ \infty\\ \\ \infty\\ \\ \infty\\ \\ \infty\\ \\ \infty\\ \\ \infty\\ \\ 1e{-}5\\ \hline 5.6e6\\ \\ \infty^{*}4\\ \\ \infty\\ \\ \infty\\ \\ 1e{-}5\\ \hline 10(14)\\ 1e{-}5\\ \hline 54(65)\\ 10(14)\\ 1e{-}5\\ \\ 3.8(4)^{*}2\\ \\ \\ \infty\\ \\ 97(112)\\ 1e{-}5\\ \\ 8.1e5\\ \\ \infty\\ \\ \infty\\ \\ 1e{-}5\\ \hline 5.2e7\\ \\ \hline 5.2e7\\ \\ \end{array}$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ e5 $ | #succ 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{MLSL}{DE}$ $\frac{\Delta f_{opt}}{f8}$ $\frac{MLSL}{DE}$ $\frac{MLSL}{DE}$ $\frac{\Delta f_{opt}}{f10}$ $\frac{MLSL}{DE}$ $\frac{\Delta f_{opt}}{f10}$ $\frac{\Delta f_{opt}}{f11}$ $\frac{\Delta f_{opt}}{f12}$ $\frac{\Delta f_{opt}}{f12}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 10, 10, 10\\ 10, 10\\ 10, 10\\ 10, 10\\ 10, 10\\ 10\\ 10, 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)\downarrow\\ \infty\\ 4\ 0.34(0.0)\downarrow\\ 1e0\\ 8661\\ 4\ 0.12(0.0)\downarrow\\ 0.12(0.0)\downarrow\\ 1e0\\ 2228\\ 4\ 0.10(0.0)\downarrow\\ 1e0\\ 2228\\ 4\ 0.10(0.0)\downarrow\\ 1e0\\ 225(310)\\ 0.89(0.0)\\ 235(310)\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 235(310)\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 0.89(0.0)\\ 1e0\\ 1e0\\ 1e0\\ 1e0\\ 1e0\\ 1e0\\ 1e0\\ 1e0$ | $\begin{array}{c} 1e-1\\ 9503\\ \infty\\ 67(63)\\ 65(49)\\ 1e-1\\ 4040\\ 0.79(0.5)\\ 27(50)\\ 1.0(1)\\ 1e-1\\ 3277\\ 40.38(0.0)_4\\ \infty\\ 40.38(0.0)_4\\ \infty\\ 40.38(0.0)_4\\ 1e-1\\ 10735\\ 40.11(0.0)_4\\ \infty\\ 40.11(0.0)_4\\ 1e-1\\ 6278\\ 40.04(9e-3\\ 1e-1\\ 2740\\ 3)\\ 0.83(6)\\ 1028(111\\ 5)\\ 0.83(6)\\ 0.$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 116524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16526 \\ 100000000000000000000000000000000000$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 118(111) \\ 175(176) \\ 1e-5 \\ 4371 \\ 0.79(0.5) \\ 30(46) \\ 1.0(1) \\ 1e-5 \\ 3594 \\ 4 \ 0.40(0.0)_{12} \\ \infty \\ 4 \ 0.40(0.0)_{14} \\ \infty \\ 4 \ 0.40(0.0)_{14} \\ \frac{1}{17073} \\ 141(50) \\ 1e-5 \\ 12285 \\ \infty \\ \infty \\ 1e-5 \\ 12407 \\ 4 \\ 1.0, 18(0.5) \\ \infty \\ 1e-5 \\ 12407 \\ 4 \\ 8.8(16) \end{array}$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 0.40(0.0)_{14} \\ 0.4e5 \\ 1e-7 \\ 17476 \\ \infty 4e5 \\ 1e-7 \\ 17476 \\ \infty 4e5 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ 0.4e5 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ 1(15) \\ 0.4e5 \\ 0.4e5 \\ 37(47) \end{array}$ | #succ 15/15 15/15 2/15 1/15 2/15 1/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/15 15/15 | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSL H | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1(0) \\ \infty \\ 1(0) \\ \hline 1(0) \\ 2.8(1) \\ 1.6(0.6)^{\star} \\ \hline 160 \\ 6541 \\ 1.0(0.9) \\ 94(122) \\ 11(31) \\ 1e0 \\ \hline 5580 \\ 3.4(4) \\ 200(251) \\ 64(108) \\ 1e0 \\ 1614 \\ 3.4(3) \\ \infty \\ 6.4(5) \\ 1e0 \\ \hline 7.5e6 \\ \infty \end{array}$ | $\begin{array}{c} 1 \mbox{field} & 1 \mbox{field} \\ 1 \mbox{field} & 1 \mbox{field} \\$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \hline \\ \infty \\ \infty \\ 1e{-}3 \\ \hline 14643 \\ 0.98(2) \\ 56(68) \\ 11(15) \\ 1e{-}3 \\ 24948 \\ \hline \\ 4.1(4)^{*} \\ \infty \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ \infty \\ 5.2e7 \\ \infty \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ 6.7e6\\ \infty\\ \infty\\ \end{array}\\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \hline \\ \infty \ 4e5 \\ 1e-7 \\ 1.3e5 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ 1.3e5 \\ \hline \\ 0.82(0.8) \\ \infty \ 4e5 \\ 22(45) \\ 1e-7 \\ \hline \\ 8.4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \hline \\ \end{array}$ | #succ 15/15 0/15 0/15 0/15 14/15 0/15 14/15 0/15 15/15 0/15 15/15 0/15 15/15 15/15 15/15 15/15 12/15 12/15 15/15 12/15 0/15 #succ 0/15 #succ 0/15 #succ 0/15 0/15 0/15 0/15 0/15 0/15 |
| $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{R}$ $\frac{\Delta f_{opt}}{fr}$ $\frac{\Delta f_{opt}}{fl0}$ $\frac{\Delta f_{opt}}{fl1}$ | $\begin{array}{c} 1e1\\ 1351\\ \infty\\ 1351\\ \infty\\ 21(5)\\ 21(5)\\ 21(5)\\ 21(5)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 13(1)\\ 0.84(0.2)\\ 10(1)\\ 1716\\ 0.17(0.0)_{\downarrow}\\ \infty\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 7413\\ 0.13(0.0)_{\downarrow}\\ 1e1\\ 1002\\ 0.17(0.0)_{\downarrow}\\ 1e1\\ 1042\\ 0.81(0.6\\ 102(112)\\ 0.81(0.6\\ 1$ | $\begin{array}{c} 1e0\\ 1e0\\ 4274\\ \infty\\ 77(57)\\ 72(54)\\ 1e0\\ 3871\\ 0.78(0.5)\\ 27(52)\\ 1.0(1)\\ 1e0\\ 3102\\ 4\ 0.34(0.0)_{\downarrow}\\ \infty\\ 4\ 0.34(0.0)_{\downarrow}\\ 1e0\\ 8661\\ 4\ 0.12(0.0)_{\downarrow}\\ \infty\\ 4\ 0.12(0.0)_{\downarrow}\\ 1e0\\ 2228\\ 4\ 0.10(0.0)_{\downarrow}\\ \infty\\ 4\ 0.10(0.0)_{\downarrow}\\ 1e0\\ 1938\\ 1938\\ 1938\\ 1938\\ 1938\\ 1938\\ 0.89(0.4)\\ 235(310)\\ 0.89(0.4)\\ 235(310)\\ 0.89(0.4)\\ 235(310)\\ 0.89(0.4)\\ 0.89(0.$ | $\begin{array}{c} 1e-1\\ 9503\\ \infty\\ 67(63)\\ 67(63)\\ 65(49)\\ 1e-1\\ 4040\\ 0.79(0.5)\\ 27(50)\\ 1.0(1)\\ 1e-1\\ 3277\\ 4\\ 0.38(0.0)_{\downarrow}\\ 4\\ 0.38(0.0)_{\downarrow}\\ 1e-1\\ 10735\\ 4\\ 0.11(0.0)_{\downarrow}\\ \infty\\ 4\\ 0.38(0.0)_{\downarrow}\\ 1e-1\\ 6278\\ 4\\ 0.04(9e-3\\ \infty\\ 4\\ 0.04(9e-3\\ 1e-1\\ 2740\\ 5)\\ 0.83(\\ 1028(111\\ 3)\\ 0.83(\\ \end{array}$ | $\begin{array}{c} 1e-3 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16526 \\ 16526 \\ 1000$ | $\begin{array}{c} 1e-5 \\ 16524 \\ \infty \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 16524 \\ 1652 \\ 100000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 10000 \\ 1000$ | $\begin{array}{l} 1e-7 \\ 16969 \\ \approx 2e5 \\ 115(119) \\ 343(395) \\ 1e-7 \\ 4484 \\ 0.78(0.5) \\ 32(45) \\ 0.99(1) \\ 1e-7 \\ 3727 \\ 10.40(0.0)_{14} \\ \approx 4e5 \\ 10.40(0.0)_{14} \\ 1e-7 \\ 17476 \\ \approx 4e5 \\ \infty 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ 1e-7 \\ 14831 \\ \approx 4e5 \\ 1e-7 \\ 13827 \\ 1e-7 \\ 13827 \\ 11(15) \\ \infty 4e5 \\ 37(47) \end{array}$ | #succ 15/15 15/15 2/15 2/15 1/15 #succ 15/15 15/15 15/15 15/15 15/15 15/15 15/15 15/15 0/ | $\frac{\Delta f_{opt}}{f19}$ MLSL DE HMLSI HMLSI DE HMLSI H | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $ | $\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} \infty \\ 1 \\ 1 \\ 0 \\ \end{array}$ $\begin{array}{c} 1 \\ 46150 \\ 11 \\ 10 \\ 2.8 \\ 1 \\ 1.6 \\ 0.6 \\ 1 \\ 10 \\ 0 \\ 0 \\ 10 \\ 1 \\ 10 \\ 0 \\ 10 \\ 1 \\ 1$ | $\begin{array}{c} 1 \mbox{ferred} 1 \mbox{ferred} 1 \mbox{sec} 1 \mb$ | $\begin{array}{c} 1e{-}3 \\ \hline 6.2e6 \\ \infty \\ \infty \\ \infty \\ \infty \\ \end{array}$ $\begin{array}{c} 2e{-}3 \\ 1e{-}3 \\ 105(128) \\ 105(128) \\ 1e{-}3 \\ 4.9e5 \\ \infty \\ \infty \\ 1e{-}3 \\ 5.2e7 \\ \infty \\ \infty \\ \end{array}$ | $\begin{array}{c} 1e{-}5\\ \hline 6.7e6\\ \infty\\ \\ \infty\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$ | $\begin{array}{c} 1e-7 \\ 6.7e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \end{array}$ $\begin{array}{c} 1e-7 \\ 5.6e6 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ 1.7589 \\ 0.91(1) \\ 48(57) \\ 9.3(12) \\ 1e-7 \\ 1.3e5 \\ 0.82(0.8) \\ \infty \ 4e5 \\ 42(45) \\ 1e-7 \\ 8.4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ \infty \ 4e5 \\ 1e-7 \\ \hline 5.2e7 \\ \infty \ 4e5 \\ \infty \ 4e5$ | #succ 0/15 0/15 0/15 0/15 0/15 12/15 0/15 14/15 0/15 0/15 14/15 0/15 0/15 114/15 15/15 5/15 7/15 #succ 112/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 0/15 |

Table 2: Expected running time (ERT in number of function evaluations) divided by the respective best ERT measured during BBOB-2009 (given in the respective first row) for different Δf values in dimension 20. The central 80% range divided by two is given in braces. The median number of conducted function evaluations is additionally given in *italics*, if $\text{ERT}(10^{-7}) = \infty$. #succ is the number of trials that reached the final target $f_{\text{opt}} + 10^{-8}$. Best results are printed in bold.