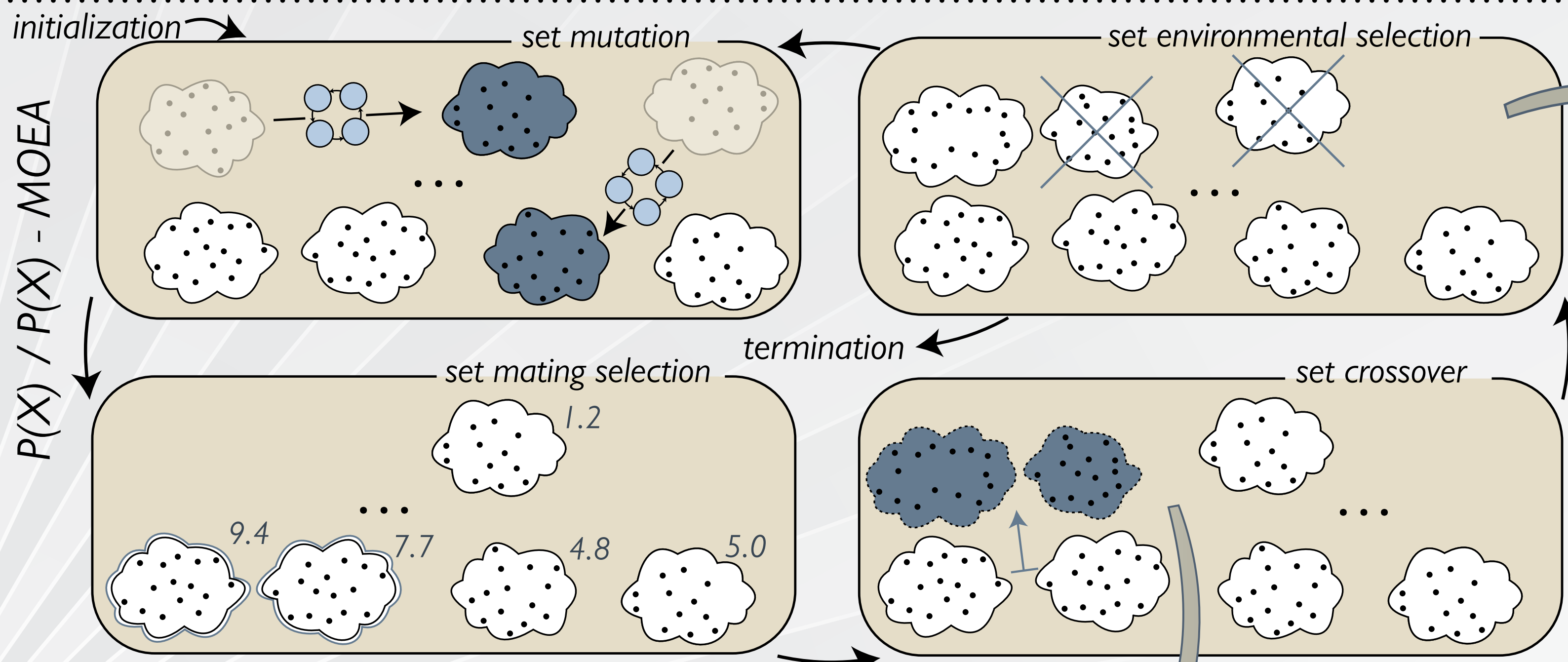
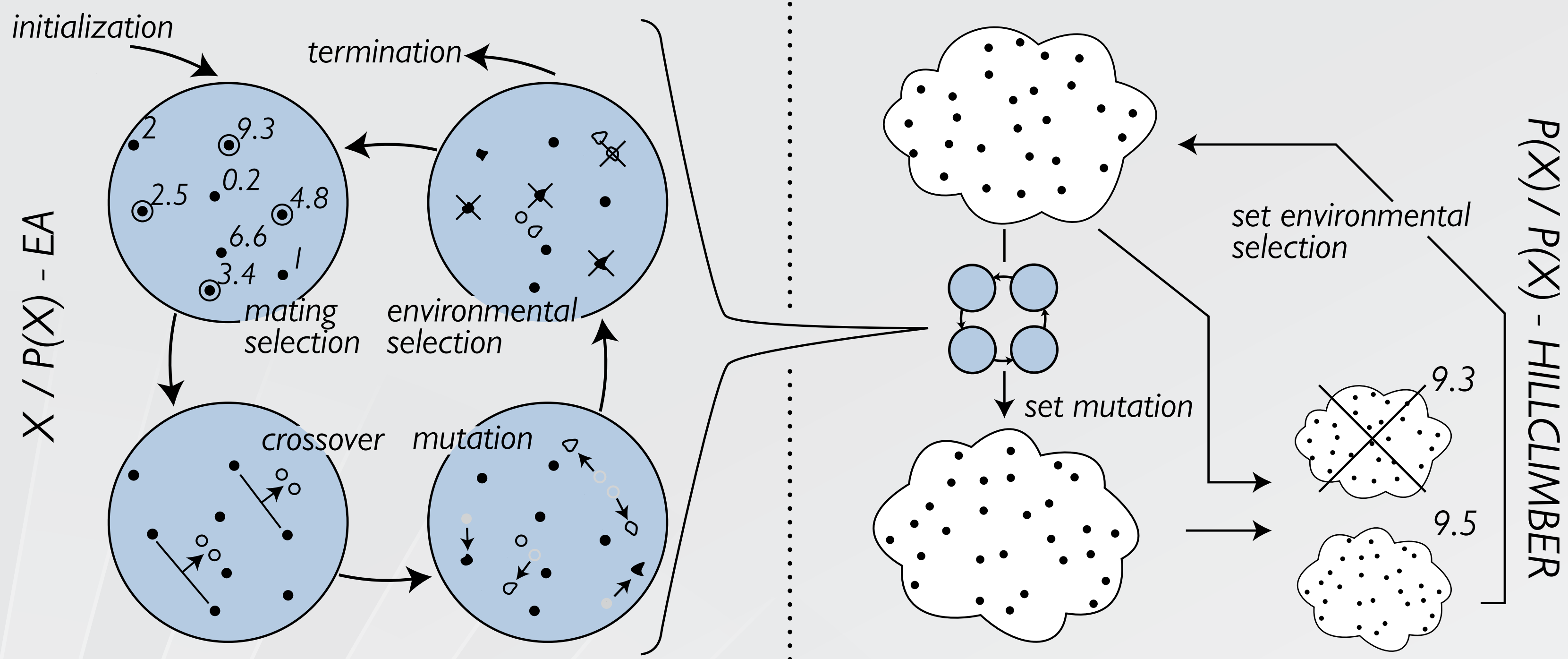


## Set-based Optimization



EMO:

- » sets of trade-off solutions in search space X are sought
- » search space is the set of all solution sets, i.e.,  $P(X)$ !

X/Y-optimizer:

searches on X and returns an element of Y

Current Status:

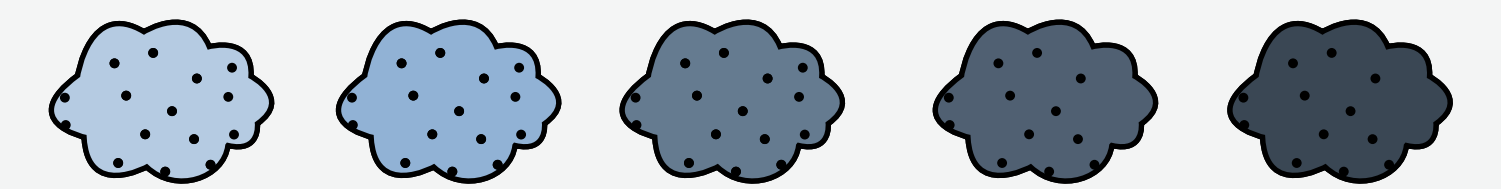
- » usual MOEAs:
  - X/P(X)-optimizer or P(X)/P(X) hillclimbers
- » parallel MOEAs (island model):
  - population-based P(X)/P(X)-optimizers
  - but no specialized set-based operators

Open Questions:

- » What are good operators on sets?
- » Is a population of sets beneficial over a hillclimber?

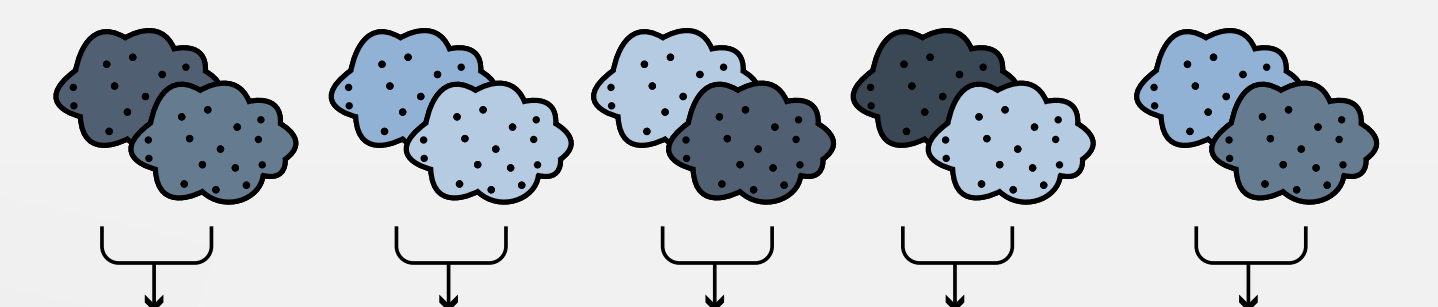
## Mating and Environmental Selection

Different ways to do mating and environmental



Variant A1

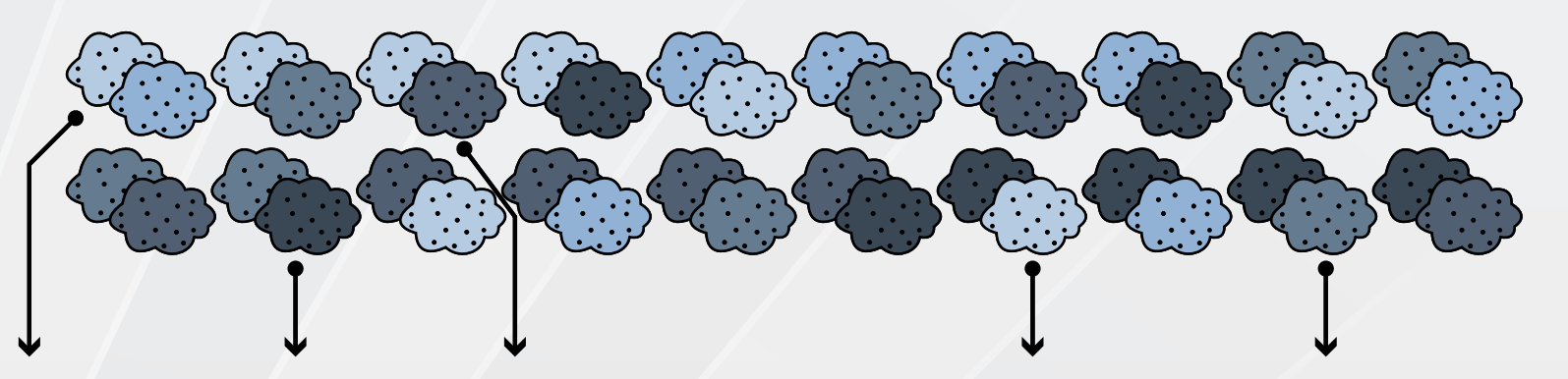
randomly select  $\mu$  pairs



replace all

Variant A2

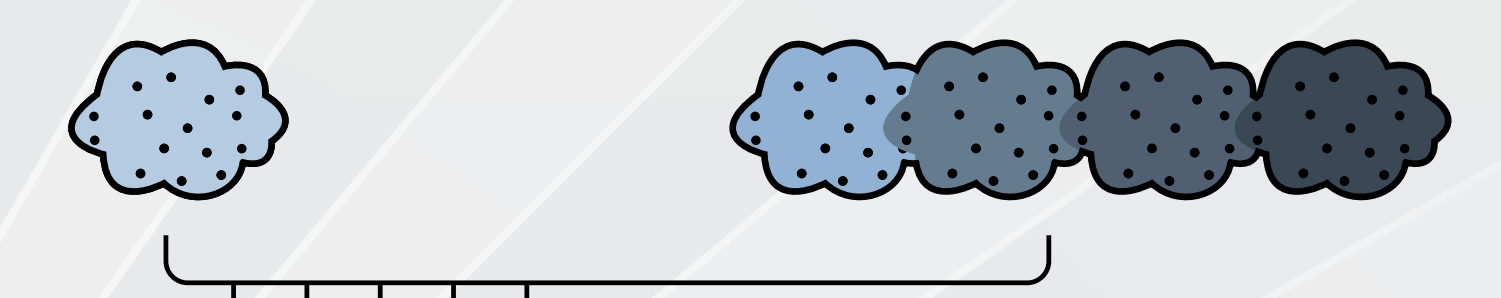
generate all  $\mu \cdot (\mu - 1)$  pairs



select  $\mu$  best

Variant B1

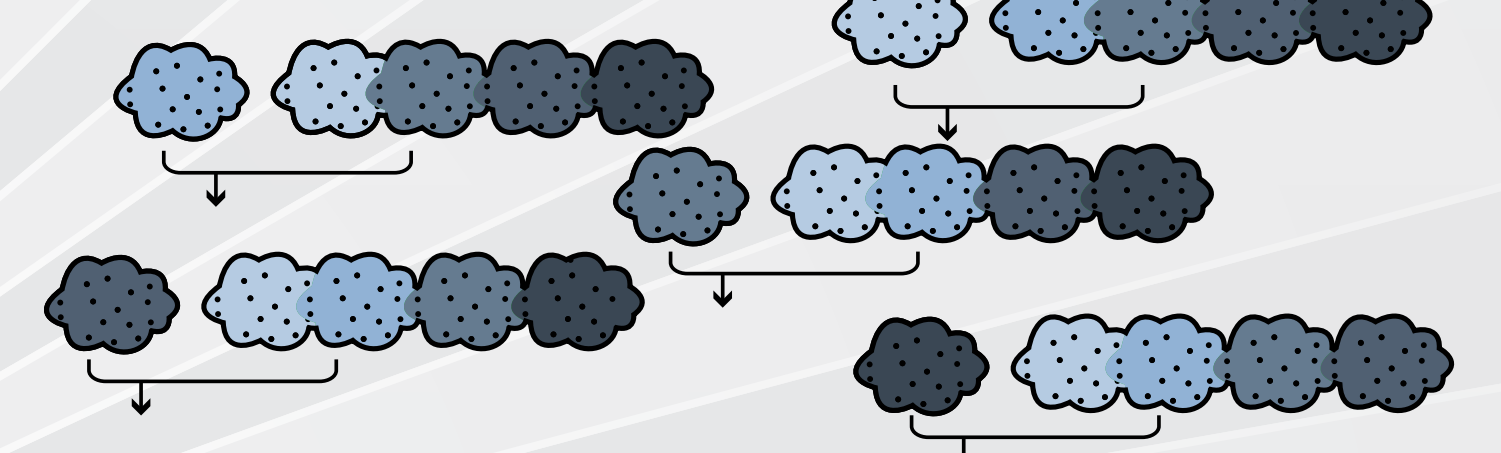
select one set, merge the rest



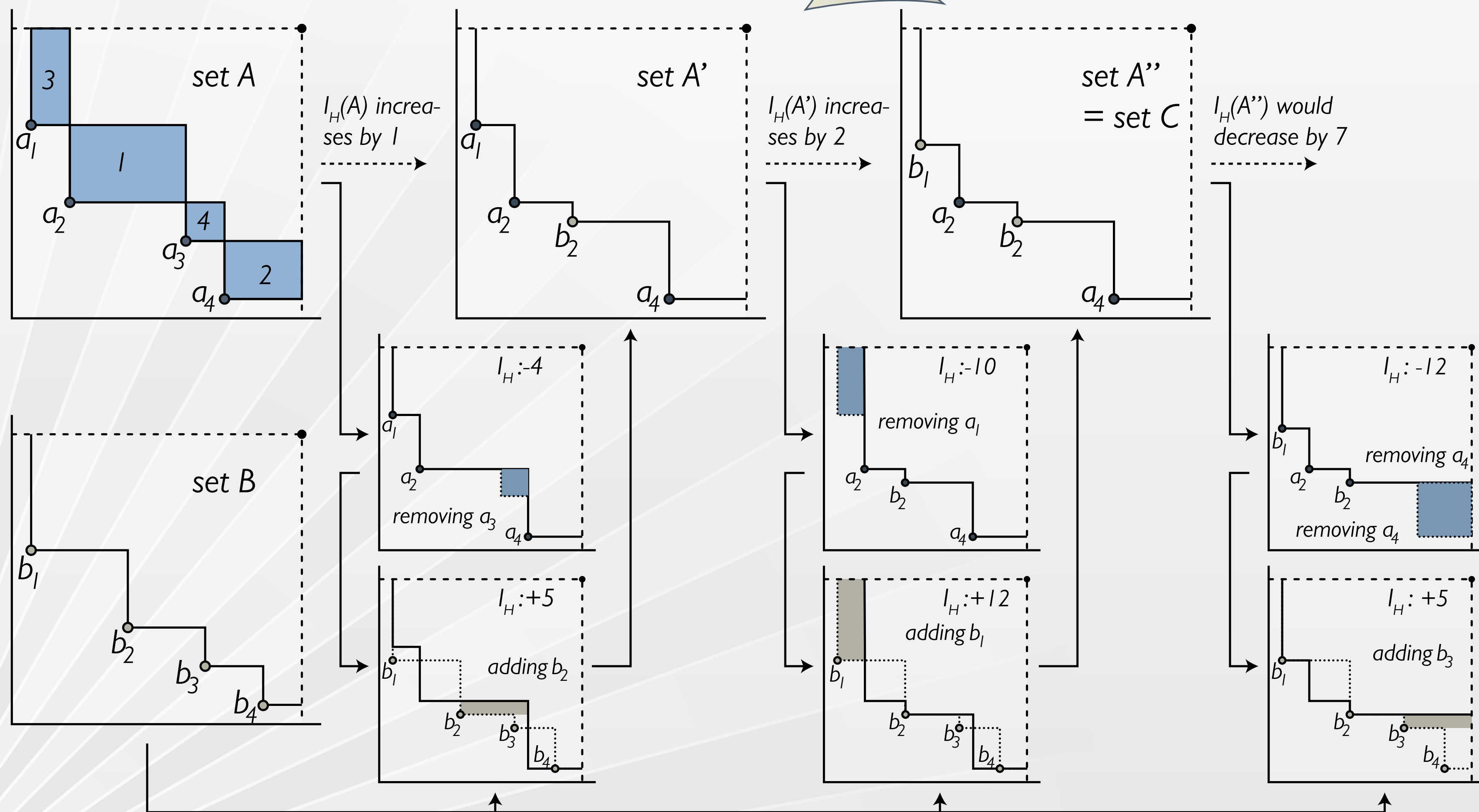
Variant B2

duplicate  $\mu$  times

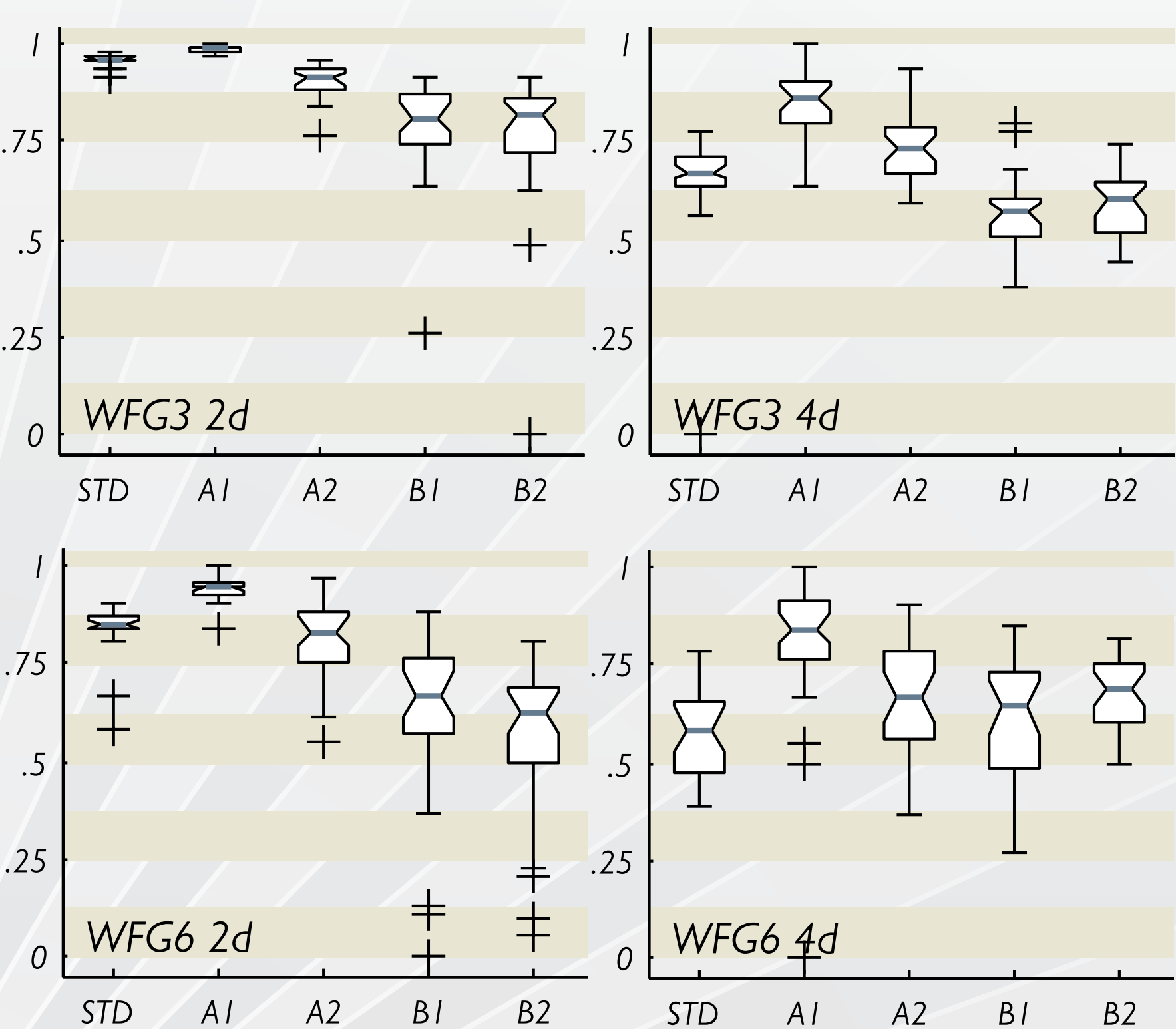
for all  $\mu$  sets recombine with union of remaining sets



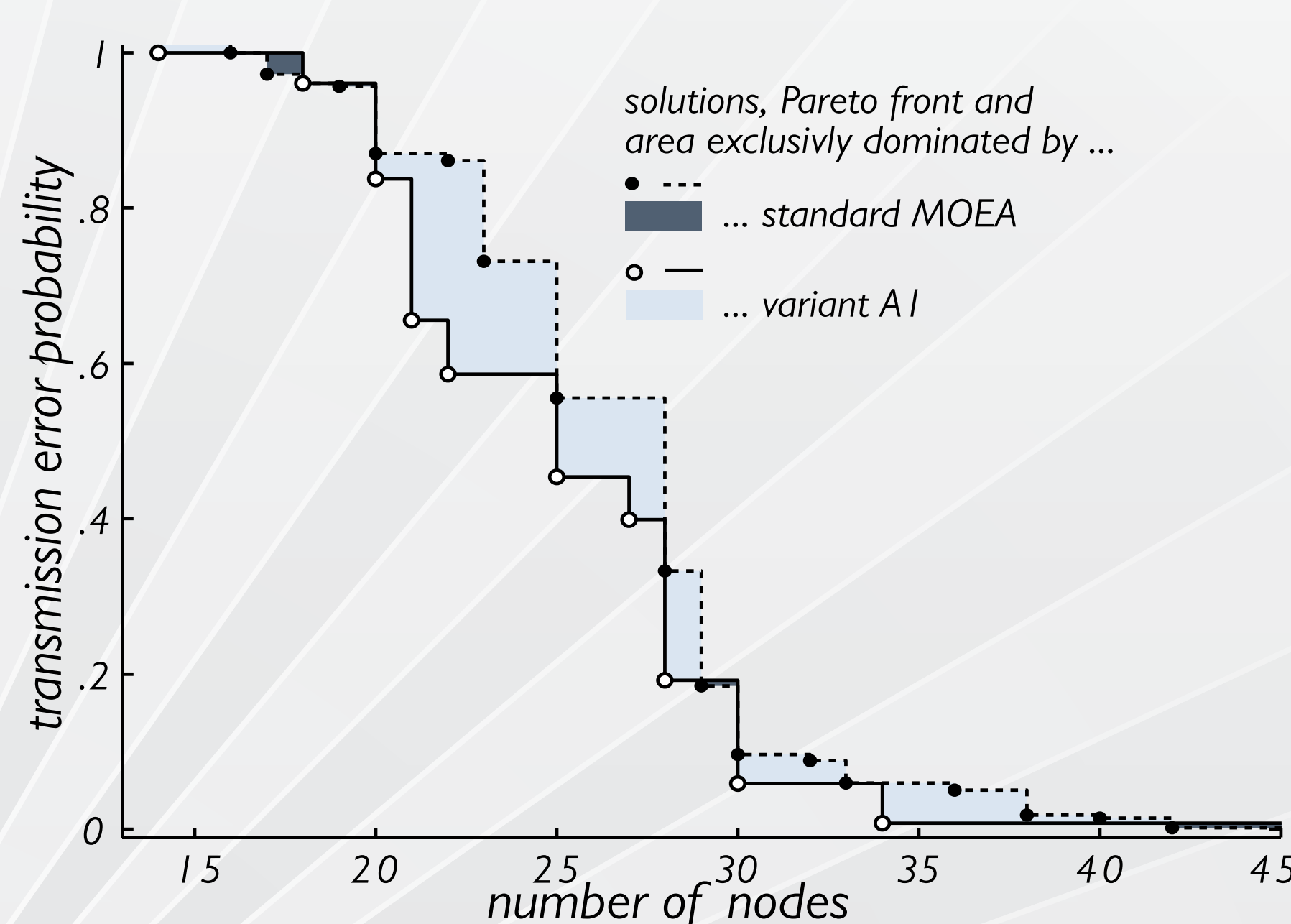
## Recombination



## Comparison



## Application



## Running time

