

## MAXIMIZING QUANTITATIVE TRAITS IN THE MATING DESIGN PROBLEM

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### Maximizing Quantitative Traits in the Mating Design Problem

We consider a version of the mating design problem in which breeders allocate a breeding budget to a set of parent pairs to maximize the expected maximum trait observed in the progeny population. In this context, the only parent pairs that receive nonzero breeding budget at optimality in the mating design problem lie on a Pareto set. Since the performance of each parent pair is assessed through Monte Carlo simulation, identifying the Pareto set is a bi-objective simulation optimization problem. We derive an asymptotically optimal simulation budget allocation to estimate the Pareto set of parent pairs that, in our numerical experiments, out-performs MOCBA in reducing misclassifications. This estimated Pareto set is used as an input to the mating design problem, which is an integer program.