

# Alternatives of Risk Modeling in Two-Stage Stochastic Programming

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**Abstract:** We discuss two principal alternatives for extending risk neutral two-stage stochastic programs into models with risk aversion.

The first alternative consists of mean-risk models. Here, a weighted sum of the mean value and a quantity expressing risk (risk measure) of the overall costs is minimized. Depending on the risk measure, different structures of equivalent mixed-integer linear programs arise. We discuss decomposition strategies for these models.

The second alternative consists of comparing the random overall costs to random benchmarks. Stochastic orders provide the means to make such comparisons mathematically rigorous. Again we finally arrive at large-scale mixed-integer linear programs whose decomposition structure will be analyzed.

For the resulting decomposition methods we report computational experiments indicating superiority over application of general-purpose mixed-integer linear programming solvers.

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