The PROBPORT Test Problems

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The probport test problem suite consists of 20 instances of a chance constrained portfolio optimization problem of the form:

$$
\begin{aligned}
\min \quad & c^\top x \\
\text{s.t.} \quad & e^\top x = 1 \\
& a_i^\top x + r z_i \geq r, \quad \forall i = 1, \ldots, m \\
& \sum_{i=1}^{m} z_i \leq k, \\
& x \in \mathbb{R}^n_+, z_i \in \{0,1\} \quad \forall i = 1, \ldots, m.
\end{aligned}
$$

The continuous variables represent investment in *n* assets, the coefficient vector *a_i* represent the return of the assets under scenario *i*, and cost vector *c* represent the investment cost, and *r* is the required return. The vector *e* is a vector of ones. The investment should be such that the portfolio return exceeds the required return *r* in at least *m-k* of the *m* scenarios.

The instances are grouped into two sets of 10 instance each: probport and probport_nr. The instances in the first group include a budget constraint (the first constraint shown above) and while those in the second group do not. Each instance has *n*=20, *m*=200, *k*=15. The instances are provided in mps format. Details on the generation of the instance data and associated computational results is available in [1].

REFERENCE:

[1] Feng Qiu, Shabbir Ahmed, Santanu S. Dey and Lawrence Wolsey. Covering Linear Programming with Violations. To appear in *INFORMS J. on Computing*, 2013.

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