WRPM1 [5, 19], is an electric power system capacity-expansion model with uncertain demand forecasts and generator reliability.

WRPM1 has finite discrete distributions for its random parameters. WRPM1 also includes a stochastic transition matrix $\tilde{B}$ to model unreliable electrical generators.

Table 1
Test problem descriptions. "rows", "cols." and "nonzeros" are, respectively, the numbers of constraints, variables and nonzero constraint entries n the associated problems. $\tilde{B}$ is actually deterministic in three of the problems

Problem	1st stage Benders decomposition algorithm for stochastic linear			2nd stage			Nonzeros in $\tilde{B}x$	Dimension of $\tilde{\xi}$	Total scenarios
a	Rows	Cols.	Nonzeros	Rows	Cols.	Nonzeros			
WRPM1	43	75	107	301	289	865	42	11	5.6×10^6

[5] G.B. Dantzig, P.W. Glynn, M. Avriel, J.C. Stone, R. Entriken, M. Nakayama, Decomposition techniques for multi-area generation and transmission planning under uncertainty, EPRI Report 2940-1, Palo Alto, California, 1989.

[19] G. Infanger, Monte Carlo (importance) sampling within a Benders decomposition algorithm for stochastic linear programs, Ann. Oper. Res. 39 (1992) 69 - 95.

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WRPM is a prototype multi-area capacity expansion planning problem for the western USA and Canada. The model is detailed, covering six regions, three demand blocks, two seasons, and several kinds of generation and transmission technologies. The objective is to determine optimum discounted least-cost levels of generation and transmission facilities for each region of the system over time. The model minimizes the total discounted costs of supplying electricity (investment and operating costs) to meet the exogenously given demand subject to expansion and operating constraints. A description of the model can be found in Dantzig et al. [8] and Avriel et al. [1]. In the stochastic version of the model, the availabilities of generators and transmission lines and demands are subject to uncertainty. There are thirteen stochastic parameters per time period (eight stochastic availabilities of generators and transmission lines and five uncertain demands) with discrete distributions with three or four outcomes. The operating subproblems in each period are stochastically independent. The test problem WRPM1 covers a time horizon of one future period and WRPM2 covers two future periods. There are differences in the parameters between WRPM1 and WRPM2. Note that in the deterministic equivalent formulation, the problem would have more than 1.5 billion (WRPM1) and more than 3 billion (WRPM2) equations.