Stochastic programming in power systems analysis

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This tutorial provides an introduction to stochastic programming, partly in general but mostly with respect to power system optimization models that explicitly deal with uncertainty. The uncertainty usually stems from unpredictability of load and/or prices of electricity, or from resource availability and fuel prices. Since most power system investments or operations involve irreversible decisions, a stochastic programming approach is meaningful. We consider both traditional cost minimization models and newer models that reflect industry deregulation processes. The oldest research precedes the development of linear programming, and most models within the market paradigm have not yet found their final form.

There are seven main topics, with breaks at suitable intervals.

1330-1410: Simple examples and warm-up discussion

Small break

1420-1500: Introductory stochastic programming concepts

1500-1530: Half-hour break

1530-1620: Power systems models

1630-1645: Scenario generation

1645-1710: More detailed case: Bidding

Small break

1720-1740: More detailed case: Hydroelectric scheduling

1740-1800: Discussion: Open issues, practical impact