

Optimization, uncertainty, and complementarity based modeling in power system dynamic performance management

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The application of market based approaches to power systems has often resulted in the reduction of stability margins as profit maximization can lead to systems being operated in stressed conditions. As systems are operated closer to their limits, it is critical that the system is modeled appropriately and that control actions take into account stability margins. The presentation will start with an overview of optimal power flow techniques and modeling approach. The presentation continues with a review of two tools for power system dynamic performance; first a Probabilistic Optimal Power Flow (P-OPF), which is used to incorporate uncertainty in system modeling; second, complementarity modeling is reviewed, as this approach allows for more appropriate modeling of how the system moves from stable equilibrium to unstable or loss of equilibrium.