

Vulnerability Analysis of Electric Power Networks

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The August 14 2003 blackout in the Northeast has turned widespread attention to the security of the electric power networks, highlighting the importance of improved operational security standards. Present practices and policies are limited by the inability to evaluate multiple simultaneous outages. We are designing algorithms to detect groups of lines, which can cause a blackout if fail collectively. While the associated graph theoretical problem is known as the network inhibition problem, the power flow equations are nonlinear, thus the graph theoretical approaches cannot be applied directly, and novel approaches are required for this nonlinearly constrained discrete optimization problem.