1. Record Nr. UNINA9910139198303321

Titolo	2010 49th IEEE Conference on Decision and Control
Pubbl/distr/stampa	[Place of publication not identified], : IEEE, 2010
ISBN	9781424477463 1424477468
Descrizione fisica	1 online resource : illustrations
Disciplina	629.836
Soggetti	Adaptive control systems Automatic control
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Sommario/riassunto	This paper is concerned with studying how the minimum power loss in a power system is related to its network topology. The existing algorithms in the literature all exploit nonlinear, heuristic, or local search algorithms to find the minimum power loss, which make them blind to the network topology. Given certain constraints on power level, bus voltages, etc., a linear-matrix-inequality (LMI) optimization problem is derived, which provides a lower bound on the minimum active loss in the network. The proposed LMI problem has the property that its objective function depends on the loads and its matrix inequality constraint is related to the topology of the power system. This property makes it possible to address many important power problems, such as the optimal network reconfiguration and the optimal placement/sizing of distributed generation units in power systems. Moreover, a condition is provided under which the solution of the given LMI problem is guaranteed to be exactly equal to the minimum power loss. As justified mathematically and verified on IEEE test systems, this condition is expected to hold widely in practice, implying that a practical power loss minimization problem is likely to be solvable using a convex algorithm.