

Transmission Constrained Economic Dispatch A Public Goods Approach

Erik Miehling and Demosthenis Teneketzis

University of Michigan, Ann Arbor











The Model and Problem

Network of generators and consumers. We wish to find the social welfare maximizing set of injections subject to

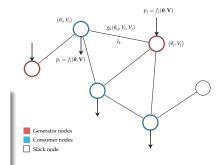
- 1 Informational constraints
 - Asymmetric information
- 2 Physical constraints and losses

Resulting problem with loss sharing:

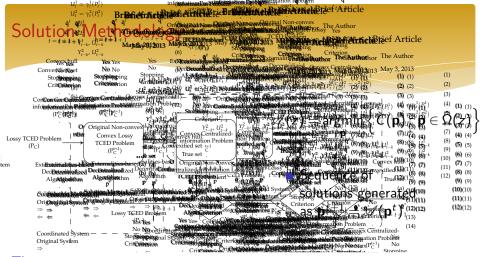
$$\min_{\mathbf{p}} c_0 \left(-\mathbf{1}^\top \mathbf{p} + \alpha_0 p_L(\mathbf{p}) \right) + \sum_{i \in \bar{\mathcal{N}}} c_i \left(p_i + \alpha_i p_L(\mathbf{p}) \right)$$

subject to

$$p_i + \alpha_i p_L(\mathbf{p}) \in [\underline{M}_i, \overline{M}_i], i \in \overline{\mathscr{N}} \\ -l_k \leqslant X_k(\mathbf{p}) - Y_k(\mathbf{p}) \leqslant l_k, \ k \in \mathscr{L}$$



Above problem is non-convex.



Theorem

The sequence of solutions, $\{\mathbf{p}\}_{t=0}^{\infty}$, converge to a local optimum of the non-convex problem while satisfying the informational constraints.

Externational Decementation of the second se

Algorithm Algorithmine and Technological Algorithm Algorithm

A Algorithmitight of the second of the secon

Algert werken I Algert werken in Algert

on bleth and used in the many of the second systems of a lattice of the second systems of the second systems of the second system of the second system of the second system of the second systems of the second systems of the second system of the second system of the second systems of the