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Routing in Networks: Distributed Game-Theoretic Algorithms

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Abstract

We study a class of noncooperative networks where N users have to send traffic to a destination node over M links with given capacities in such a way that a Nash equilibrium is achieved. Under three different cost structures for the individual users, we either establish the existence and uniqueness of Nash equilibria or show that in some cases there will be a multitude of Nash equilibria. For the former cases, we obtain several dynamic policy adjustment schemes for the on-line computation of the Nash equilibrium, and study their global or local convergence properties. These policy adjustment schemes require minimum information on the part of each user regarding the cost/utility functions of the others.