Multicommodity Routing Problems

By Tobias Harks

Cuvillier Verlag Sep 2007, 2007. Taschenbuch. Book Condition: Neu. 210x147x12 mm. Neuware - One of the main goals of this thesis was to understand the consequences of selfish behavior and limited knowledge about future information on the performance of routing strategies. We identified three practical applications for the considered models arising in road traffic networks and in the Internet. First, we studied online routing strategies within the framework Online-MCRP that modeled the interactions of service providers in an inter-domain resource market. In such a market, network capacity is traded in order to deploy Internet traffic with Quality of Service requirements. We showed that a greedy online algorithm, which corresponds to a natural cost minimization strategy of a service provider, leads to a routing pattern that is not too inefficient. In particular, we showed that for polynomial price functions in Cd, the competitive ratio of this greedy online algorithm can be bounded by a constant factor (depending on d) for arbitrary networks and commodity sequences. Even though the provable bounds are quite large, these bounds show that the proposed inter-domain market may not lead to arbitrary inefficient resource allocations. In practice, however, there are many more additional requirements to consider. For...

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