Dynamic Network Utility Maximization with Delivery Contracts

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- Manuscript
- IFAC paper
- IFAC talk slides
- Matlab script for examples (requires CVX to run)

We consider a multi-period variation of the network utility maximization problem that includes delivery constraints. We allow the flow utilities, link capacities and routing matrices to vary over time, and we introduce the concept of delivery contracts, which couple the flow rates across time. We describe a distributed algorithm, based on dual decomposition, that solves this problem when all data is known ahead of time. We briefly describe a heuristic, based on model predictive control, for approximately solving a variation on the problem, in which the data are not known ahead of time. The formulation and algorithms are illustrated with numerical examples.