Introduction to Coordination Mechanisms

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Ideally when users share the resources of a system they behave in a way that optimizes the performance of the system. However, when the users are selfish, they will act in a way that optimizes their own individual and usually conflicting objectives. The price of anarchy is an attempt to measure the deterioration in performance of a system due to selfish behavior of its users or components.

Given that in many cases the price of anarchy is high, one can ask how to redesign a game or a system to improve its price of anarchy. There are interesting suggestions such as adding taxes or more choices to players. A natural way to address the problem of redesigning a game is the notion of coordination mechanisms: Given a system, we try to optimize price of anarchy in the class of games that result when we increase the cost on the facilities and when we differentiate among players with player-specific costs.

Relevant publications

- R. Cole, Y. Dodis, and T. Roughgarden. *Pricing network edges for heterogeneous selfish users*. STOC 2003, pages 521--530.
- G. Christodoulou, E. Koutsoupias, and A. Nanavati. *Coordination mechanisms*. ICALP 2004, pages 345--357.
- E. Koutsoupias and C. H. Papadimitriou. *Worst-case equilibria*. STACS 1999, pages 404-413.
- D. Monderer and M. Tennenholtz. *k-Implementation*. ACM EC 2003, pages 19--28.
- T. Roughgarden and E. Tardos. *How bad is selfish routing?* Journal of the ACM, 49(2):236-259, 2002.