The Price of Fairness

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In this paper we study resource allocation problems that involve multiple self-interested parties or players, and a central decision maker. We introduce and study the price of fairness, which is the relative system efficiency loss under a “fair” allocation assuming that a fully efficient allocation is one that maximizes the sum of player utilities. We focus on two well-accepted, axiomatically justified notions of fairness, viz. proportional fairness and max-min fairness. For these notions we provide a tight characterization of the price of fairness for a broad family of problems.

Keywords: analysis of algorithms; games/group decisions: bargaining; programming: multiple criteria, nonlinear: applications, algorithms.

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