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Existence of Equilibrium for Integer Allocation Problems

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Abstract

In this paper we show that if all agents are equipped with discrete concave production functions, then a feasible price allocation pair is a market equilibrium if and only if it solves a linear programming problem, similar to, but perhaps simpler than the one invoked in Yang (2001). Using this result, but assuming discrete concave production functions for the agents once again, we are able to show that the necessary and sufficient condition for the existence of market equilibrium available in Sun and Yang (2004), which involved obtaining a price vector that satisfied infinitely many inequalities, can be reduced to one where such a price vector satisfies finitely many inequalities. A necessary and sufficient condition for the existence of a market equilibrium when the maximum value function is Weakly Monotonic at the initial endowment that follows from our results is that the maximum value function is partially concave at the initial endowment.

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