

# Computation of equilibria for Cobb-Douglas economy based on the power method

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## Abstract

We consider the general economy with agents maximizing Cobb-Douglas utilities from the algorithmic perspective. It is known that finding equilibrium prices reduces to an eigenvalue problem for a particularly structured stochastic matrix. We show that the power method for solving this eigenvalue problem can be interpreted as a natural price adjustment procedure executed by an auctioneer. Its rate of convergence is established under the reasonable assumption of pairwise connectivity w.r.t. goods within the submarkets. It is shown that the pairwise connectivity remains valid under sufficiently small perturbations of agents tastes and endowments. Moreover, the property of pairwise connectivity holds for almost all Cobb-Douglas economies, i.e. in the regular case.

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