
Monomolecular reaction networks: a new proof of flux transitivity

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Abstract

We study the network response to perturbations of a reaction rate j^* . Specifically, we describe which other reaction rates j' respond by nonzero reaction flux, at steady state. Nonzero responses of j' to j^* are called flux influence of j^* on j' . Mochizuki and Fiedler established transitivity of flux influence, for monomolecular reaction networks. We give a new, independent, and conceptually simplified proof of that intriguing fact. Our proof uses standard connectivity concepts from graph theory, and Menger's Theorem. Based on the network structure, only, this also leads to a simplified characterization of all flux influence sets.

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