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An Upper Bound to Catastrophe Size in Ecosystems DERVIS VURAL, VU NGUYEN, University of Notre Dame — Ecological systems and complex chemical reactions are well described by the law of mass action. If one or more new species is introduced into the system due to a mutation or migration event, the system state can undergo significant displacements, in some cases, including mass extinction. In the context of ecological and evolutionary engineering, species may also be designed or chosen to be injected into the system, to steer the system to a more desirable state. Here we present exact analytical formulas that constrain the magnitude of singular transitions in reaction networks, and discuss their implications on ecological engineering and natural evolution.

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