

1112-12-550

Stefan Müller* (stefan.mueller@ricam.oeaw.ac.at). *Sign conditions for injectivity of generalized polynomial maps.*

We give necessary and sufficient conditions in terms of sign vectors for the injectivity of families of polynomial maps with arbitrary real exponents defined on the positive orthant. Our work relates and extends existing injectivity conditions expressed in terms of Jacobian matrices and determinants. In the context of chemical reaction networks with power-law kinetics, our results can be used to preclude as well as to guarantee multiple positive steady states. In the context of real algebraic geometry, our work allows the first partial multivariate generalization of the classical Descartes' rule, which bounds the number of positive real roots of a univariate real polynomial in terms of the number of sign variations of its coefficients. (Received August 11, 2015)