An LMI Criterion for the Global Stability Analysis of Nonlinear Polynomial Systems

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Abstract: This paper presents an original practical criterion of global stability analysis of nonlinear polynomial systems. This criterion derived from the application of the Lyapunov direct method with a quadratic function generalizes the famous Lyapunov stability condition for linear systems. Useful mathematical transformations have allowed the formulation of the obtained conditions as an LMI (Linear Matrix Inequalities) problem according to the polynomial system parameters.