

**An Interval Arithmetic Approach for the
Estimation of the Robust Domain of Attraction
for Non-linear Autonomous Systems
with Non-linear Uncertainties**

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Abstract

The estimation of the domain of attraction is an important topic in control theory. However, many systems are influenced by uncertain parameter, which vary the domain of attraction. Such uncertainties could be for example temperature drift or friction of a robot wheel, which varies while lifetime. Furthermore, system parameter could be varied by the user. In most cases, time-depended parameter fluctuate in an known interval. To ensure the system is stable for all configurations of uncertainties, the robust domain of attraction (RDA) has to be estimated. In this talk, a method based on interval arithmetic and Lyapunov's second method is presented to handle that problem. By an iterative bisection of the state space and uncertainty space, the RDA is successively enclosed.