Computational Issues in the Analysis of Adaptive Control Systems

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Abstract

Adaptive systems under slow parameter adaptation can be analyzed by the method of averaging. This provides a means to assess stability (and instability) properties of most adaptive systems, either continuous-time or (more importantly for practice) discrete-time, as well as providing an estimate of the region of attraction. Although the method of averaging is conceptually straightforward, even simple examples are well beyond hand calculations. Specific software tools are proposed which can provide the basis for user-friendly environment to perform the necessary computations involved in the averaging analysis.