

Interpolation based model reduction

Dorota Kubalińska and Angelika Bunse-Gerstner

University of Bremen, Germany

Abstract

State-space models of dynamical systems are often of very high dimension. It is then desirable to find systems of the same form but of lower complexity, whose input-output behaviour approximates the behaviour of the original system. Such reduced order models are typically constructed by projecting the state space of the system. There are several approaches to find such projective subspaces. In this talk we give a brief survey on a rational Hermite interpolation approach and its generalization to tangential interpolation. We show also how the projection matrices can be computed via solving Sylvester equations. First order necessary conditions for H_2 -optimal model reduction are presented for SISO (single-input-single-output) as well as for MIMO (multiple-input-multiple-output) discrete and continuous systems. From the H_2 -optimal conditions we derive a good choice of interpolation data. Numerical experiments report the efficiency of the proposed method.

Keywords

Model reduction, Rational interpolation, Tangential interpolation, Sylvester equation, H_2 approximation.

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