

Reduced order modeling and tangential interpolation

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Abstract

Model reduction aims at replacing a system of differential or difference equations of high complexity by one of much lower complexity. In so doing, one tries to preserve certain critical properties of the system (e.g. stability) and approximate well important features (e.g. the system response). During the last four decades, a lot of progress has been made in the time-invariant theory of this approximation problem. The lecture will review the foundations of this theory and will present the key results of frequency and time domain approximations. More recently, the need has arisen to apply these methods to problems of very high dimension, in which cases the resulting computational complexity becomes prohibitively high. Therefore, different approaches to the problem have been developed, including tangential interpolation using rational Krylov techniques and data driven interpolation using Loewner and shifted Loewner matrices.

References

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