

System Norms for LPV Approximations

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The computation of system norms is an important part of system-theoretic model order reduction (MOR). For linear time-invariant (LTI) systems, norms are well-defined and accessible formulas are available and one may well say that the handling of the relevant system norms is what makes the popular MOR methods Balanced Truncation and IRKA performant.

Beyond LTI systems, already the definition of the system norms comes with several theoretical difficulties and there only exists a few heuristic computational approaches to their evaluation.

In this work, we review the basic concepts of system norms and how they have been used for measuring linear parameter-varying (LPV) systems. We consider simplifying structures in the parameter dependencies, we comment on their applicability for the quantification of approximation errors, and propose reformulations for the efficient numerical evaluation of the norms.

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