

A Tight Balanced Truncation Error Bound, with an Application to Arrowhead Systems

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Abstract: Balanced truncation model reduction for linear dynamical systems yields reduced-order models that satisfy a well-known error bound involving the system's Hankel singular values. We show that this bound holds with equality for a certain class of single-input, single-output systems that exhibit a generalized state-space symmetry based on the sign parameters of a linear system. We prove an additional result showing how to determine this state-space symmetry from a system's arrowhead realization, and illustrate these results with an example from power systems modeling. This is joint work with Dr. Serkan Gugercin and Dr. Mark Embree.

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