International J. of Engg. Research & Indu. Appls. (IJERIA).
ISSN 0974-1518, Vol.2, No.IV (2009), pp 135-142

A NOVEL MODEL REDUCTION METHOD FOR LINEAR DISCRETE INTERVAL SYSTEMS USING ROOT CLUSTERING TECHNIQUE

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Abstract

Model reduction is often required in the analysis and design of high order complex systems involving high order transfer functions. Numerous techniques on reducing order of fixed coefficient systems have come up, both for continuous time as well as discrete – time systems. Since most of the practical systems are to be modeled as interval systems, necessity of analysis of interval systems through their reduced order models has gained importance. This work deals with developing a model reduction method for high order linear discrete interval systems using a Root Clustering technique combined with bilinear and inverse bilinear transformations. The proposed method is simple to apply and has the stability preserving feature i.e., if the original linear discrete interval system is stable, the proposed reduction procedure yields a stable reduced order model. A couple of examples are presented to support the proposed reduction method.

Keywords: linear discrete interval systems, bilinear transformations, model reduction, root clustering.