Reduced Order Bilinear Time Invariant System by Means of Error Transfer Function Least Upper Bounds

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Abstract: The order selection problem of the reduced bilinear time invariant systems is considered in this paper. The r-*th* order reduced bilinear time invariant systems are chosen by using the least upper bound of the difference bilinear system in the proposed H_2-norm. The H_2-norm of the difference bilinear system is computed by the H_2-norm of the error transfer function between the full order and the reduced order of a bilinear time invariant system. The reduced bilinear systems are obtained by using the balanced truncation and the singular perturbation methods. The H_2-norm of the difference bilinear systems is a function of controllability gramian or observability gramian of the difference bilinear system. The simulation results in the example confirm the proposed method for obtaining the reduced bilinear system which is similar to the full order bilinear system.

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