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Research Article

MIMO System Reduction Using Modified Pole Clustering and Genetic Algorithm

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Abstract

A new mixed method for reducing the order of the large-scale linear dynamic multi-input-multi-output (MIMO) systems has been presented. In this method, the common denominator polynomial of the reduced-order transfer function matrix is synthesized by using modified pole clustering while the coefficients of the numerator elements are computed by minimizing the integral square error between the time responses of the original and reduced system element using Genetic Algorithm. The modified pole clustering generates more dominant cluster centres than cluster centres obtained by pole clustering technique already available in literature. The proposed algorithm is computer-oriented and comparable in quality. This method guarantees stability of the reduced model if the original high-order system is stable. The algorithm of the proposed method is illustrated with the help of an example and the results are compared with the other well-known reduction techniques.