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Direct and Parallel QR based subspace decomposition methods for system identification

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Abstract
In this paper we present two computationally efficient methods for computing the past and future input-output data for subspace system identification. The proposed methods employ Direct and Parallel QR decomposition for tall and skinny matrix where many more rows than columns are involved. Data matrix of deterministic and stochastic system has been used. The proposed methods compared to a standard QR decomposition show a significant reduction in the computational time and the complexity of the system in terms of number of operations and memory storage. The system matrices are identified by making use of Kalman filter states and Canonical Variate Algorithm (CVA). The simulation results illustrate that proposed methods require less processing time and low complexity, and provide high accuracy in identifying the system parameters compared to the standard QR decomposition. © 2014 IEEE.

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