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Linear MIMO Model Identification Using an Extended Kalman Filter

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Abstract : Linear Multi-Input Multi-Output (MIMO) dynamic models can be identified, with no a priori knowledge of model structure or order, using a new Generalised Identifying Filter (GIF). Based on an Extended Kalman Filter, the new filter identifies the model iteratively, in a continuous modal canonical form, using only input and output time histories. The filter's self-propagating state error covariance matrix allows easy determination of convergence and conditioning, and by progressively increasing model order, the best fitting reduced-order model can be identified. The method is shown to be resistant to noise and can easily be extended to identification of smoothly nonlinear systems.

Keywords : system identification, Kalman filter, linear model, MIMO, model order reduction
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