

Investigating Safe Operation Condition for Iterative Learning Control under Load Disturbances Effect in Singular Values

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Abstract : An iterative learning control framework designed in state feedback structure suffers a lack in investigating load disturbance considerations. The presented work discusses the controller previously designed, highlights the disturbance problem, finds new conditions using singular value principle to assure safe operation conditions with error convergence and reference tracking under the influence of load disturbance. It is known that periodic disturbances can be represented by a delay model in a positive feedback loop acting on the system input. This model can be manipulated by isolating the delay model and finding a controller for the overall system around the delay model to remedy the periodic disturbances using the small signal theorem. The overall system is the base for control design and load disturbance investigation. The major finding of this work is the load disturbance condition found which clearly sets safe operation condition under the influence of load disturbances such that the error tends to nearly zero as the system keeps operating trial after trial.

Keywords : iterative learning control, singular values, state feedback, load disturbance

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