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Design of Reaching Phase for Variable Structure Controller Based on SVD Method

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Abstract: This paper considers a design of variable structure with sliding mode controller for a class of uncertain dynamic system based on Singular Value Decomposition (SVD) method. The proposed method reduces the number of switching gain vector components and performs satisfactorily while the external disturbance does not satisfy the matching conditions. Subsequently the stability of the global system is studied and furthermore, the design of switched gain matrix elements based on fuzzy logic approach provides useful results for smooth control actions and decreases the reaching phase time. The efficacy of the proposed method is demonstrated by considering an interconnected power system problem.

Keywords: reaching-phase; sliding mode; matching condition; singular value decomposition; fuzzy logic; Lyapunov function;

AMS Subject Classification: 93C95; 93C42; 93D30; 93B12;