

## Parallel Particle Swarm Optimization Optimized LDI Controller with Lyapunov Stability Criterion for Nonlinear Structural Systems

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**Abstract :** In this paper, we present a neural network (NN) based approach represent a nonlinear Tagagi-Sugeno (T-S) system. A linear differential inclusion (LDI) state-space representation is utilized to deal with the NN models. Taking advantage of the LDI representation, the stability conditions and controller design are derived for a class of nonlinear structural systems. Moreover, the concept of utilizing the Parallel Particle Swarm Optimization (PPSO) algorithm to solve the common P matrix under the stability criteria is given in this paper.

**Keywords :** Lyapunov stability, parallel particle swarm optimization, linear differential inclusion, artificial intelligence

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