

Decentralized Control of Interconnected Systems with Non-Linear Unknown Interconnections

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Abstract : In this paper, a novel decentralized controller is developed for linear systems with nonlinear unknown interconnections. A model linear decoupled system is assigned for each system. By using the difference actual and model state dynamics, the problem is formulated as inverse problem. Then, the interconnected dynamics are approximated by using Galerkin's expansion method for inverse problems. Two different sets of orthogonal basis functions are utilized to approximate the interconnected dynamics. Approximated interconnections are utilized in the controller to cancel the interconnections and decouple the systems. Subsequently, the interconnected systems behave as a collection of decoupled systems.

Keywords : decentralized control, inverse problems, large scale systems, nonlinear interconnections, basis functions, system identification

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