Decentralized Control of Interconnected Linear Systems with Delayed States

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Abstract: This paper addresses the problems of stability analysis and decentralized control of interconnected linear systems with constant time-delays in the state of each subsystems as well as in the interconnections. We develop delay-dependent methods of stability analysis and decentralized stabilization via linear memoryless state-feedback. The proposed methods are given in terms of linear matrix inequalities. Extensions of the decentralized stabilization result to more complex control problems, such as decentralized static output feedback, decentralized $\mathcal{H}_\infty$ control, decentralized robust stabilization, and decentralized robust $\mathcal{H}_\infty$ control are also discussed.