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Decentralized $\mathcal{H}_2$ Controller Design for Descriptor Systems: An LMI Approach

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Abstract: This paper considers a decentralized $\mathcal{H}_2$ control problem for multi-channel linear time-invariant (LTI) descriptor systems. Our interest is to design a *low order* dynamic output feedback controller. The control problem is reduced to a feasibility problem of a bilinear matrix inequality (BMI) with respect to variables of a coefficient matrix defining the controller, a Lyapunov matrix and a matrix related to the descriptor matrix. Under a matching condition between the descriptor matrix and the measurement output matrix (or the control input matrix), we propose to set the Lyapunov matrix in the BMI as block diagonal appropriately so that the BMI is reduced to LMIs.

Keywords: *Multi-channel descriptor system; $\mathcal{H}_2$ control; decentralized control; bilinear matrix inequality (BMI); linear matrix inequality (LMI).*

Mathematics Subject Classification (2000): 93B40, 93B50, 93C05, 93C15, 93D25.