Necessary and Sufficient Conditions for Passivity of Descriptor Systems

Ezra Zeheb

Technion - Israel Institute of Technology and Jerusalem College of Engineering

In this talk, Descriptor Systems are discussed, i.e. linear systems whose state space characterization is singular. Necessary and sufficient spectral conditions for various notions of strict positive realness for single-input single-output descriptor systems will be given.These ensure passivity of the systems. Essentially, these conditions only require calculation of eigenvalues of a single matrix.This is a significant advantage for testing of positive realness even for regular systems characterized by transfer functions. The talk is based on a joint work with Robert Shorten and Shravan Sajja.