Michiels, Wim; Gumussoy, Suat
Eigenvalue based algorithms and software for the design of fixed-order stabilizing controllers for interconnected systems with time-delays. (English) Zbl 1275.93031

Summary: An eigenvalue based framework is developed for the stability analysis and stabilization of coupled systems with time-delays, which are naturally described by delay differential algebraic equations. The spectral properties of these equations are analyzed and their stability properties are studied, taking into account the effect of small delay perturbations. Subsequently, numerical methods for stability assessment and for designing stabilizing controllers with a prescribed structure or order, based on a direct optimization approach, are briefly addressed. The effectiveness of the approach is illustrated with a software demo. The paper concludes by pointing out the similarities with the computation and optimization of $H_{\infty}$ norms.

For the entire collection see [Zbl 1275.93004].

MSC:
- 93B40 Computational methods in systems theory (MSC2010)
- 93B60 Eigenvalue problems
- 93D21 Adaptive or robust stabilization
- 93C15 Control/observation systems governed by ordinary differential equations

Keywords:
eigenvalue based algorithms; stabilizing controllers; interconnected systems with time-delays; differential algebraic equations; spectral properties

Software:
Matlab; HANSO

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