On perturbations in the leading coefficient matrix of time-varying index-1 DAEs

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Abstract:

We study exponential stability and its robustness for time-varying linear index-1 differential-algebraic equations. The effects of perturbations in the leading coefficient matrix are investigated. A reasonable class of allowable perturbations is introduced. Robustness results in terms of the Bohl exponent and perturbation operator are presented. Finally, a new stability radius involving these perturbations is introduced and investigated. In particular, a lower bound for the stability radius is derived. The results are presented by means of illustrative examples.