

Controller Parameterization for Disturbance Response Decoupling: Application to Vehicle Active Suspension Control

Malcolm Smith and Fu-Cheng Wang

Abstract

This paper derives a parameterization of the set of all stabilizing controllers for a given plant which leaves some prespecified closed-loop transfer function fixed. This result is motivated by the need to independently shape several different disturbance transmission paths in vehicle active suspension control. The result is studied in the context of quarter-, half-, and full-car vehicle models, to derive appropriate controller structures. A controller design is carried out for the full-car case and simulated with a nonlinear vehicle dynamics model.