

Controller Design for Active Suspension System of 1/4 Car with Unknown Mass and Time-Delay

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Abstract : The purpose of this paper is to present a modeling and control of the quarter car active suspension system with unknown mass, unknown time-delay and road disturbance. The objective of designing the controller by deriving a control law to achieve stability of the system and convergence that can considerably improve the ride comfort and road disturbance handling. This is accomplished by using Routh-Herwitz criterion and based on some assumptions. A mathematical proof is given to show the ability of the designed controller to ensure stability and convergence of the active suspension system and dispersion oscillation of system with unknown mass, time-delay and road disturbances. Simulations were also performed for controlling quarter car suspension, where the results obtained from these simulations verify the validity of the proposed design.

Keywords : active suspension system, time-delay, disturbance rejection, dynamic uncertainty

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