

Using Adaptive Pole Placement Control Strategy for Active Steering Safety System

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Abstract : This paper studies the design of an adaptive control strategy to tune an active steering system for better drivability and maneuverability. In the first step, adaptive control strategy is applied to estimate the uncertain parameters on-line (e.g. cornering stiffness), then the estimated parameters are fed into the pole placement controller to generate corrective feedback gain to improve the steering system dynamic's characteristics. The simulations are evaluated for three types of road conditions (dry, wet, and icy), and the performance of the adaptive pole placement control (APPC) are compared with pole placement control (PPC) and a passive system. The results show that the APPC strategy significantly improves the yaw rate and side slip angle of a bicycle plant model.

Keywords : adaptive control, active steering, pole placement, vehicle dynamics

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