

半主动空气悬架Fuzzy—PID控制

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摘要: 针对空气悬架控制中的问题,采用Fuzzy—PID复合控制技术,即把模糊推理运用于PID参数的整定,对半主动空气悬架加以研究。设计了Fuzzy—PID控制器,用于半主动空气悬架1/4车辆模型控制的Matlab/Simulink仿真模拟和台架试验。仿真模型中借助S函数和Fuzzy Inference System Toolbox构建Fuzzy—PID模块,仿真结果表明:与传统的PID控制仿真比较,该控制策略下的半主动空气悬架能降低簧上质量加速度和悬架动行程,具有较好的鲁棒性,使车辆平顺性有一定程度的提高。台架试验与仿真结果基本吻合。The Fuzzy—PID complex technology was adopted to solve the control technical problem of air suspension. The fuzzy reasoning was applied to the self-tuning of PID parameters, and the research was conducted on semi-active air suspension. A Fuzzy—PID controller was designed, which was used in Matlab/Simulink simulation and bench test of 1/4 model of the semi-active air suspension. A Fuzzy—PID module was constructed with S function and Fuzzy Inference System Toolbox in the simulation model. Compared with the traditional PID control, the control of the semi-active air suspension could be used to reduce the sprung mass acceleration and suspension action itinerary with better robustness advantages, and improve ride comfort. The simulated results agreed well with the testing data.

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