汽车电子机械制动系统设计与仿真

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摘　要: 给出了汽车电子机械制动系统（EMB）执行系统的设计方法并在Matlab/Simulink下建立了其仿真模型。EMB控制系统采用由压力环、转速环及电流环串连而成的三闭环结构，给出了其设计方法。对目标压力阶跃输入、半余弦输入以及脉冲输入3种典型工况进行了仿真，结果表明EMB系统除了在消除制动间隙时，制动压力具有较大的超调外，均能很好地跟随目标制动压力的变化，验证了所设计EMB系统的合理性；EMB系统与液压制动系统的对比表明，EMB系统对制动压力的调节更迅速，精度更高。　The actuator and controller of electromechanical brake (EMB) were designed. The simulation model of EMB was built in Matlab/Simulink. The controller of motor adopted three loops control architecture with cascaded force, speed and current control loops, and the design method of controller was given. Computer simulation on three-typical-condition of step input, half cosine input and pulse input has been carried out. The results showed that the brake pressure of EMB could follow the target accurately and the performance of EMB is good. The comparison of hydraulic brake and EMB showed that EMB could regulate brake force more quickly and accurately.

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