

连通式油气悬架升降同步控制 Lifting Synchronization Control for Interconnected Hydro-pneumatic Suspension

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关键词: 油气悬架 同步升降 平稳切换 仿真

摘要: 提出了一种基于调速阀和压力跟随元件的改进型连通式油气悬架系统。利用调速阀和压力跟随元件的有效组合,完成了系统刚柔性状态间的平稳切换,实现了大型工程车辆整车的同步升降。建立油气悬架系统AMESim仿真模型,对变负载工况下系统同步升高进行了仿真。搭建相关试验台,对该改进型系统进行试验研究,其升高过程的同步误差小于2.5mm,刚柔性状态切换平稳,悬架缸无抖动现象。试验与仿真结果吻合,既验证了改进型连通式油气悬架系统的可行性,又验证了仿真模型的正确性。Based on flow control valve and pressure following element, an improved interconnected hydro-pneumatic suspension was presented. The suspension system achieved rigid-flexible status switching smoothly through effective combination of flow control valve and pressure following element, lifting synchronization of heavy construction vehicle was finally realized. Hydraulic system simulation model of interconnected hydro-pneumatic suspension was established in AMESim and simulation analyses for synchronization performance were carried out at variable load conditions. The test bench was set up and the experimental research was performed. Experimental results showed that synchronization error was less than 2.5 mm in the lifting process and suspension cylinder did not appear jitter when rigid-flexible status switching. The agreement between the simulation results and the experimental data proved the feasibility of the improved interconnected hydro-pneumatic suspension and the accuracy of the simulation model.

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