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## 连通式油气悬架数学模型及特性分析

### Mathematical model and characteristics analysis of interconnected hydro-pneumatic suspension

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作者	单位
<a href="#">王增全</a>	<a href="#">北京科技大学机械工程学院, 北京 100083</a>
<a href="#">申焱华</a>	<a href="#">北京科技大学机械工程学院, 北京 100083</a>
<a href="#">杨 珏</a>	<a href="#">北京科技大学机械工程学院, 北京 100083</a>

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中文摘要:

为研究参数变化对连通式油气悬架刚度与阻尼特性的影响, 该文建立了连通式油气悬架非线性数学模型, 并考虑了液体的压缩和运动过程中摩擦力的影响。通过搭建试验台并建立仿真模型, 将理论、试验、仿真数据进行对比, 误差在10%以内, 验证了数学模型的正确性。基于该数学模型讨论了初始充气压力、激励频率与初始相位差变化对连通式油气悬架刚度特性的影响, 分析结果表明: 初始充气体积增大连通式油气悬架刚度减小; 激励频率与左右两侧悬架缸相位差增大系统刚度、阻尼均增大; 初始充气压力变化对其性能影响较小。

英文摘要:

In order to study the effect of parameter variation on the stiffness and damping characteristics of interconnected hydro-pneumatic suspension, a non-linear mathematical model of interconnected hydro-pneumatic suspension was formulated considering the compressibility of fluid and the motion friction. A test bed was constructed and a simulation model of interconnected hydro-pneumatic suspension was established. The simulation results were compared with experiment results and theory results. The error was within 10%. Besides, the effects of initial inflation pressure, excitation frequency, and phase difference between the right and left hydraulic cylinders on interconnected hydro-pneumatic suspension were also investigated based on the mathematical model. The results indicated that the bigger the initial inflation volume was, the smaller the stiffness became. The bigger the excitation frequency and phase difference were, the bigger the stiffness and damping characteristics became. The initial inflation pressure can hardly affect the characteristics.

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