

基于Matlab/Simulink的随机路面建模与不平度仿真 Modeling and Simulation on Stochastic Road Surface Irregularity Based on Matlab/Simulink

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摘要: 在分析路面空间频率功率谱密度、时间频率功率谱密度与方差之间关系的基础上,建立了路面随机信号生成模型,在不同车速情况下进行了仿真,生成了B和C级随机路面时间激励信号。利用功率谱密度和方差分析,对所建立模型的仿真结果与路面分级标准进行比较,证明所建模型产生的随机信号功率谱和方差值与国家规定的路面等级标准一致,结果准确,可以为车辆控制研究提供可靠的激励信号。In the time domain analysis of vehicle ride comfort, the veracity of the input excitation signals is directly related to the simulation result. The random road model was constructed by Matlab/Simulink based on the study of the relation of stochastic road space and time frequency power spectral density (PSD) and PSD and root-mean-square (RMS). The stochastic excitation signals were produced, and the vertical displacement of the B and C level uneven road was built by simulation with different vehicle velocities. By PSD and RMS analysis of vertical displacement of simulation result and national standards, the correctness of model was confirmed. That can offer reliable excitation signals for control research of vehicle. It proves that the idea and methods of modeling is unique and practical.

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