电机与电器

基于传声器阵列电动汽车用电机系统噪声源识别研究

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摘要：　为了满足电动汽车电机驱动系统工作噪声源定位的研究需要，在基于波束成型理论分析的基础上，利用十字形阵列进行了噪声源识别试验研究，确定了该电机系统工作过程中的的主要噪声源依次为风扇、变速箱和电机本体的部分区域。为了验证试验结果，与基于声强测试理论的分布测点法试验结果进行了对比研究。结果表明，在试验条件下，基于声阵列的电动汽车用电机系统噪声源识别方法比基于声强测试理论的分布测点法更为快捷，而识别效果相同。进一步说明声阵列方法在工作环境中有效实现机械或电气设备噪声源定位的可行性。

关键词：　传声器阵列　电动汽车　电机　噪声源识别　实验研究

Research of Noise Source Identification of Traction Motor System for Electric Vehicle Based on Microphone Array

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Abstract: In order to satisfy the noise source identification of driving motor system on electric vehicle, based on the "sum and delay" algorithm of the beamforming theory in the time domain signal processing, the experiments about noise are studied through the crossed planar microphone array, which consists of 27 microphones. During the experiment, the motor runs at the speed of 1000 r/min and the torque is 380 N×m. The results indicate that the main noise sources are fan, gear-box and some structures of the traction motor. To validate the experiment results, the experiments about noise are studied through the measurement at discrete points based on the theory of sound intensity. The results indicate that the method based on sound array can identify noise sources more quickly than that based on sound intensity and they are all effective. The method of sound array can also be feasibly used in the other mechanism or electric equipment to identify noise source.

Keywords: microphone array　electric vehicle　traction motor　noise source identification experimental study

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