小波域二维隐Markov模型滤波方法

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关键词： 旋转机械 振动信号 二维隐Markov模型 小波分析 滤波

摘　要： 针对旋转机械工作过程中产生非平稳信号的特点，在分析非平稳振动信号小波分解后同层小波数和层间小波系数之间关系的基础上，结合二维隐Markov模型（2D-HMM）拓扑结构的表达能力，提出小波域2D-HMM滤波方法，并给出了具体的实现步骤，最后通过Bently-Nevada转子试验系统的实测信号验证算法的有效性。结果表明：小波域2D-HMM滤波算法能够有效地去除非平稳振动信号的噪声。The 2-D hidden Markov model (2D-HMM) has the ability of representing the signals, which are non-stationary and worse reappearance in the rotor run-up process. Analyzing the relationship of different level wavelet coefficients and the same levels, a new filtering method based on wavelet 2D-HMM was proposed and its detail steps were presented. Finally, this method was validated by the data collected from Bently-Nevada rotor experimental system (Model 24755). The results demonstrate that it is effective to remove the noise of non-stationary signals of rotor system.

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