

## 悬臂梁结构模态参数Hilbert-Huang变换识别方法

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摘要: 结合悬臂梁在脉冲激励下的实测加速度响应记录, 将Hilbert-Huang变换(HHT)方法应用于悬臂梁结构模态参数识别中。利用HHT方法识别悬臂梁结构的各阶固有频率和阻尼比, 并将结果与悬臂梁结构的固有频率理论值、功率谱法得到的各阶固有频率值, 以及分别用半功率带宽法、频率细化法、时域衰减法得到的各阶阻尼比进行比较。对比表明HHT方法有很好的识别效果。同时发现了HHT提取模态不完整, 以及会出现“虚假模态”的问题。The practical application of Hilbert-Huang transformation (HHT) method for structural modal parameters identification to a cantilever beam was investigated according to measured data of the acceleration response time histories for the cantilever beam under impulse excitation. The natural frequencies and modal damping ratios of the cantilever beam were identified using HHT method in combination with measured data. The identification results for the natural frequencies were compared with theoretical natural frequencies and those provided by the power spectrum method. Finally, the identification results for the modal damping ratios were compared with those provided by the half-power bandwidth method, the ZOOM FFT method and the time history decaying method, separately. The results demonstrate that HHT method is effective, robust and promising to structural parameters identification. Some problems of HHT method, such as it can not identify full modes and maybe identify “false modes”, are found.

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