

基于异响信号的发动机故障成分提取

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Fault component extraction of engine based on abnormal sound

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摘要

提出了基于异响信号的故障成分提取方法,以实现... 该方法分别利用错位叠加法、互相关函数、叠加段起始位置搜寻方法来提取异响信号成份。首先,根据异响信号局部极值出现的位置确定异响信号产生的起始位置,并确定各截取信号段的长度;将各截取的信号段进行线性相加,实现故障成分的提取。然后,对信号的误差进行分析,提出误差的影响因素。最后,利用互相关性分析判断截取信号的准确性。实验结果表明:通过错位叠加算法提取的多段异响信号故障成分相关性达到75%以上,可以用于故障诊断。根据错位叠加算法提取异响信号故障成分无需进行时频转换,方法简单易行,提取的故障成分的波形准确性高。

关键词 : 发动机, 异响信号, 故障提取, 错位叠加, 互相关

Abstract :

An approach of fault component extraction for abnormal sound was proposed to realize the online automatic diagnosis of engines. In the method, an overlap superimposed method was proposed for noise elimination, and the correlation analysis and the beginning position of dislocation superimposed interception signal searching method were used to establish the signal analysis system. Firstly, the local extreme value of abnormal sound was used to determine the beginning position of abnormal sound appearance and to calculate the length of interception signal according to the separation distance of the adjacent starting points. Then, these intercepted signals were linearly superposed together to acquire the fault component. Furthermore, the error of extracted signal was analyzed and the effect factors on the errors were obtained. Finally, the cross-correlation analysis method was adopted to identify the results. Experimental results indicate that the relevance among several extracted signals reaches to 75% by the dislocation method, which can be used for fault diagnosis. The method is no complicated time frequency conversion process in extracting fault components and has advantages in simple operation and high accuracy.

Key words : engine abnormal sound fault component extraction overlap superimposing cross correlation

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