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基于小波能量谱和粗糙集的离心式压缩机振动故障诊断

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摘 要：结合小波能量谱和粗糙集理论各自优点，采用尺度小波能量谱计算公式对实测的时域信号进行尺度小波能量谱计算。以尺度小波能量谱为特征参数，对应故障为决策属性，结合粗糙集理论进行故障诊断规则获取，从而提出一种基于小波能量谱和粗糙集理论的离心式压缩机振动故障诊断方法。研究结果表明：测试样本对象诊断正确率为100%；该方法不需要精确计算离心式压缩机振动的故障特征频率，与传统的提取时域和频域参数方法相比，诊断正确率达88.5%。

关键字：小波能量谱；粗糙集；特征参数；离心式压缩机；故障诊断

Fault diagnosis of centrifugal compressor vibration based on wavelet power spectrum and rough set theory

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Abstract: Combining the advantages of wavelet power spectrum and rough set, scale wavelet power spectrum about measured time domain signal was calculated using scale wavelet power spectrum formula, wavelet power spectrum was made as attribute parameters and corresponding fault as decision property, and rough set was used to build the simpler knowledge base of intelligent fault diagnosis system. A new fault diagnosis method on centrifugal compressor vibration based on wavelet power spectrum and rough set theory was presented. The results show that correct diagnosis ratio of measurement samples is 100%. This method is applied to centrifugal compressor vibration fault diagnosis successfully, the fault diagnosis ratio and is 88.5%, which is higher than that of the traditional method using time and frequency parameters.

Key words:wavelet power spectrum; rough set; attribute parameters; centrifugal compressor; fault diagnosis

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