电工理论与新技术

金属磁记忆检测中应力集中区信号的识别

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摘要： 金属磁记忆技术可以快速检测出铁磁构件的应力集中区，对其故障进行早期诊断。磁记忆信号非常微弱，容易受到外来噪声和干扰影响，使得难以准确确定应力集中区。针对含有噪声非平稳性的漏磁信号，在原有信号特征量梯度的基础上，给出了新的时域空间梯度和峰-峰值组合特征量，以及能量峰值处理方法，有效消除了随机噪声对磁记忆信号的影响，提高了应力集中区的识别率；从磁记忆信号的奇异性检测角度出发，通过多尺度小波系数的平方相关一致性来确定真正的应力集中区；实验验证了所提方法的有效性。

关键词： 金属磁记忆 应力集中 小波分析 峰-峰值 能量

Recognition of Signals for Stress Concentration Zone in Metal Magnetic Memory Tests

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Abstract: Metal magnetic memory (MMM) technique is an effective method to find stress concentration zone, which provides early diagnosis for the ferromagnetic material. Metal magnetic memory signal is weak and easy to be influenced by noise and disturbance. Thereby the stress concentration zone is difficult to be detected. The two methods are presented for non-stationary leakage signals based on original feature gradate. One is a combination of the peak-peak and grads, the other is mean energy method, with the methods eliminate influence of noise and the stress concentration identification is improved. Based on the relativity for wavelet coefficient square, the signal singularity detection theory of wavelet transform was employed to determine metal magnetic memory. Experiment shows that the method is valid for leakage signal.

Keywords: metal magnetic memory stress concentration wavelet analysis peak-peak energy

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