

激光技术

时频-Radon变换在激光微多普勒效应特征提取中的应用

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摘要:

鉴于激光微多普勒效应探测运动目标复合振动的重要性, 利用离散小波多分辨分析对激光微多普勒效应探测运动目标复合振动的实验数据进行分解, 研究不同尺度下的信号特征. 将Radon变换与时频分析结合在一起, 对实验所得信号在时频域中进行分析, 结果表明: 时频-Radon变换适合于微多普勒信号的识别, 应用该方法能够抑制多分量信号时频分布产生的交叉项干扰, 有效地提取微动目标的特征, 为目标特征的识别、分类和探测提供了便利.

关键词: 微多普勒效应 Radon变换 小波变换 时-频分析 多震源

Application of time-frequency Radon transform in feature extraction of laser micro-Doppler effect

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Abstract:

Since laser micro-Doppler has important applications in detecting the complex vibration of a moving target, discrete wavelet transform multi-resolution analysis is used to represent the experimental data of laser micro-Doppler for detecting complex vibration of moving target to study the signal characteristics at different scales. Radon transforms and time-frequency analysis are combined together to analyze the experimental signal of vibrating target in time-frequency domain. Results show that this method is suitable for recognizing micro-Doppler signal, and it can suppress the cross terms interference produced by the time-frequency distribution of multi-component signals and efficiently extract features of the vibrating target for detection, identification and classification.

Keywords: micro-Doppler effect Radon transform wavelet transform time-frequency analysis multiple vibration sources

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