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激光光幕战斗部破片速度测试系统的信号处理(PDF)

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Title: Signal Processing of Laser Screen Warhead Velocity Measurement System

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关键词: 激光光幕; 战斗部破片; 速度; 信号处理

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摘要: 为解决战斗部破片速度测试中信号难于处理的问题,讨论了破片信号处理算法。采用小波分解、重构的方法对信号进行去噪;采用峰值法进行破片计时特征点的拾取;采用双正交小波,依据波形趋势及宽度在不同尺度上查找峰值,解决波形起伏大的问题;采用相关系数法,解决破片先进后出的问题;采用Gabor变换,解决破片波形叠加的问题。进行了多种战斗部破片速度测试试验,结果表明:破片密度 ≤ 20 片/ m^2 时,捕获率可达98%以上,并可给出各破片的速度值。

Abstract: Aiming to solve problems of warhead fragments signals processing, signal processing algorithm was discussed. The noise of signal was reduced by employing wavelet decomposition and reconstruction. The time of fragment pass through the target was obtained by adopting peak detection algorithm. Based on the method of search peak in different width scale and waveform trend by using double orthogonal wavelet, the problem of rolling waveform was solved. The problem of fragment first in, last out was analyzed, by using correlation coefficient algorithm. The problem of splicing of multiple waves was researched by employing Gabor transform which is an algorithm in joint time frequency analysis. Lots of fragments experiments of the different types of the warheads were conducted. Experimental results show that: warhead fragments capture rate of system is better than 98%, and velocity of every fragment can be given

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