

光纤技术

基于滤波法的光纤光栅传感解调方案

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摘要 FBG传感器对应变和温度的敏感体现在其反射光中心波长的变化上, 因此如何测量波长的变化就成为FBG传感器的关键。在光纤光栅的多种解调方法中, 因滤波法的测量器件制作简单, 测量系统简易、方便直观而被广泛应用。主要介绍了8种基于滤波法的解调方法, 对它们各自的成本、检测精度、测量范围、器件制作以及适用的环境进行了详细的比较, 分析了它们的优缺点, 以便于在不同的检测条件下选用最佳的解调方案。重点介绍了光学小波滤波解调法, 探讨了其测量系统的原理, 并指出该方法可用于微弱信号的检测与处理。

关键词 [光纤光栅](#) [传感解调](#) [滤波方法](#)

分类号

Demodulation scheme for filtering method based fiber Bragg grating sensing

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Abstract Because the sensitivity of the fiber Bragg grating (FBG) sensor to the strain and temperature is observed through the variation of its reflected light wavelength, it is important for FBG sensor to measure the change of the wavelength. Although there are many demodulation methods nowadays, filtering demodulation technique finds more applications because the measurement devices are easy to make, simple in structure and convenient to operate. Eight kinds of filter based demodulation methods are introduced in order to select an optimum demodulation method for the specific application, these demodulations are compared in terms of cost, accuracy, measurement range, manufacture of the devices and applicable environment, their advantages and disadvantages are analyzed. The optical wavelet transform filtering is introduced emphatically, the principle of the measurement system is discussed in depth and its potential applications are pointed out.

Key words [fiber Bragg grating](#) [sensing demodulation](#) [filtering method](#)

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