عنوان مقاله:

(Detection of Cracks in Cantilever Beam with Orthogonal Matching Pursuit (OMP) and Iterative Hard Threshold (IHT

محل انتشار:

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خلاصه مقاله:

One of the most common issues in examining the health of structures is determining the severity and location of any possible cracks in them. In order to ensure proper functioning of many structures, they need to be continuously examined. Common methods in this area are non-destructive tests such as X-rays and ultrasound, which have resulted in high cost for researchers to develop methods based on structural analysis, one of the first features of damaged structures, changes in structural stiffness, and as a result, the natural frequencies and modes of the modes change. In recent years, compressed sensing (CS) has achieved remarkable success compared to the Shannon-Nyquist sampling theorem. The CS is based on the assumption that most natural signals are sparse when displayed on a suitable base (e.g. wavelet base, Fourier, etc.) and thus can be used for sampling unnecessary portions of the signal when sampling. This resulted in a significantly reduced sampling rate compared to the Nyquist rate. In this paper, we used real data, using a CS approach and applying the Orthogonal Matching Pursuit (OMP), and the Iterative Hard Threshold (IHT) to detect the presence of a crack in a cantilever beam, with the least number of sampling frequencies. The numerical results of these algorithms show that the OMP method uses much less signal data than the IHT method to detect the presence of a crack in the cantilever beam and performs better in the presence of different noise bounds.

کلمات کلیدی:

compressed sensing, Nyquist sampling, sparse signal, support recovery

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