عنوان مقاله:

A Novel Finite-Element-Based Algorithm for Damage Detection in the Pressure Vessels Using the Wavelet Approach

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خلاصه مقاله:

In this investigation a suitable algorithm for the detection of cracks in the pressure vessels is presented. The equations of motion for the vessel are obtained and transferred into the wavelet space in a simplified form resulted from time and position approximations. The locations of cracks are randomly distributed in different regions of the structure to cover the whole geometry of the pressure vessel. Furthermore, the pressure vessel is installed vertically with a fixed end at the bottom of each of its four leg supports. Then, the results are transferred to the wavelet space using Daubechies wavelet families. From the comparison of the displacement results associated with the intact and damaged vessels, it can be clearly seen that the crack location can be accurately detected noting the alteration in the wavelet output diagrams .The results of the crack detection show that with the proper selection of the wavelet type, the wavelet based finite element method is a suitable and nondestructive method as well as a powerful numerical tool for the detection of cracks and other discontinuities in the pressure vessels. The results of this investigation can be .used in the marine and aerospace industries as well as power stations

کلمات کلیدی:

Crack Detection, Pressure vessel, Cylindrical vessel, Wavelet method, Daubechies wavelet