

عنوان مقاله:

Study of the Effect of an Open Transverse Crack on the Vibratory Behavior of Rotors Using the h-p Version of the Finite Element Method

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خلاصه مقاله:

In this paper, we use the hybrid h-p version of the finite element method to study the effect of an open transverse crack on the vibratory behavior of rotors, the one-dimensional finite element Euler-Bernoulli beam is used for modeling the rotor, the shape functions used are the Hermite cubic functions coupled to the special Legendre polynomials of Rodrigues. The global matrices of the equation of motion of the cracked rotor are derived by the application of the Lagrange equation taking into account the local variation in the shaft's stiffness due to the presence of the crack, and the stiffness of the cracked element of the shaft are determined using the time-varying stiffness method. Numerical results generated by a program developed in MATLAB show the rapidity of the convergence of the h-p version of FEM compared to the classical version, after the validation of our results with theoretical and experimental results and other obtained with the simulator ANSYS Workbench, a parametric study was provided to show the influence of the depth and position of the crack on the vibratory behavior of a symmetrical and asymmetrical rotor.

کلمات کلیدی:

Rotor, Open transverse crack, h-p version of FEM, Time-varying stiffness

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