عنوان مقاله:

Ultrasonic Wave Scattering from an Embedded Cylinder in Viscoelastic Matrix Using FE-based Short-Pulse MIIR Method

محل انتشار:

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نویسندگان:

Alireza Khaksar - *MSc. Student, Department of Mechanical Engineering, Petroleum University of Technology*;

Sina Sodagar - *Assistant Professor, Department of Mechanical Engineering, Petroleum University of Technology*;

خلاصه مقاله:

In this paper, a FE-based RUS approach is presented to evaluate the embedded elastic cylindrical targets in viscoelastic matrix. For this purpose, finite element method is employed to simulate the ultrasonic wave scattering from a cylinder embedded in a viscoelastic matrix. Incidence of ultrasonic plane wave from a transmitter and the resulting scattered wave field from the embedded cylinder are simulated using commercial software package ABAQUS/Explicit. The modified short-pulse MIIR method was employed to calculate the far-field backscattered frequency spectrum, form function, of the embedded cylinder and investigate the effects of viscoelasticity of matrix medium. Comparison of the FEM results and the reported mathematical results using normal mode expansion method shows a good agreement between the obtained FE-based form function and the mathematical results in the range of frequency bandwidth of the transducer. It is observed that presence of Rayleigh damping factor for the matrix medium leads to a significant change of higher resonance frequencies, specifically at the center frequency of transducer.

کلمات کلیدی:

Ultrasonic, Viscoelastic, Scattering, MIIR