

In-plane free vibration of circular FG disks

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Abstract

This paper presents the in-plane free vibration of the circular FG disks including annular FG disks. Based on the two-dimensional linear elastic theory, the motion equations of the circular FG disks are derived by using the developed meshfree boundary-domain integral equation method. The material gradients of the circular disks are assumed to distribute along the space coordinates obeying an exponential law. The natural frequencies and vibration modes are calculated for the FG disks with free, simply-supported and clamped edges. The effectiveness of the material gradients on the vibration response is also investigated in details. Through these computations, the capability and simplicity of the developed method for the circular FG disks eigenvalue analysis is demonstrated, convergence and accuracy are thoughtfully examined.

Keywords: Free vibration, circular FG disks, meshfree, boundary-domain integral equation method, material gradient, eigenvalue analysis

Acknowledgement: This project is supported by the Macau science and technology development fund (FDCT Project no: 004/2014/A).