عنوان مقاله:

CHAOTIC RESPONSE AND BIFURCATION ANALYSIS OF A TIMOSHENKO BEAM WITH BACKLASH SUPPORT SUBJECTED TO MOVING MASSES

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خلاصه مقاله:

A simply supported Timoshenko beam with an intermediate backlash is considered. The beam equations of motion . are obtained based on the Timoshenko beam theory by including the dynamic effect of a moving mass travelling along the vibrating path. The equations of motion are discretized by using the assumed modes technique and solved using the Runge–Kutta method. The analysis methods employed in this study are the dynamic trajectories of the beam midpoint, power spectra, Poincare´ maps, bifurcation diagrams and Lyapunov exponents. The dimensionless backlash gap coefficient and the moving mass speed are used as control parameters. The numerical results reveal that the system exhibits a diverse range of periodic, sub-harmonic, and chaotic behaviors. The onset of chaotic motion is identified from the phase diagrams, power spectra, Poincaré maps, and Lyapunov exponents of the system. Therefore, the main aim of this study is to provide a better understanding of the characteristics and dynamic behaviors of the beams subjected to moving masses

کلمات کلیدی:

Non-ideal suppor, Chaotic vibration, Timoshenko beam; Moving mass, Bifurcation diagram, Lyapunov exponents

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