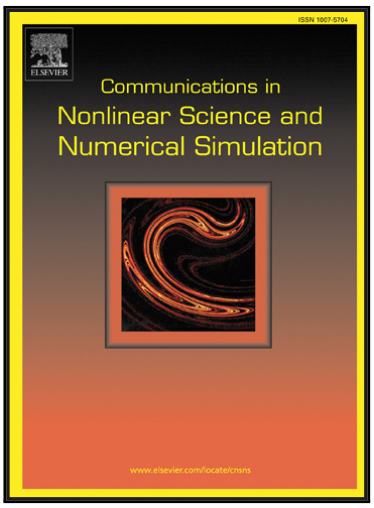

Effect of Gravity-Induced Asymmetry on the Nonlinear Vibration of an Overhung Rotor

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Highlights

- The effect of varying gravity on nonlinear dynamics of an overhung rotor is studied numerically
- Regions of periodic, quasi-periodic and chaotic behaviour shown through methods such as bifurcation analysis and Lyapunov exponent spectra.
- The results presented here show that gravity introduces rich dynamic phenomenon into the rotor. For the zero gravity, case the system only has periodic and quasi-periodic solutions. Upon increasing the gravity parameter, the system now exhibits multi-periodic and chaotic solutions. Rotating frame used to give more insight into the nature of the solutions, particularly for the zero gravity case.
- the isotropic assumption for stiff rotors was found to be reasonably robust in the presence of imperfections since the orbits for the zero gravity case looked quite similar to that of $^{g} = 0.05$ and 0.22.