

On the vibrational analysis for the motion of a rotating cylinder

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Abstract: The main purpose of this work is to study the motion of 2-DOF of an auto-parametric dynamical system attached with a damped system. The governing equations of motion are gained utilizing Lagrange's equations in terms of the generalized coordinates. The method of multiple scales (MS) is used to obtain the solutions of the governing equations up to the third order of approximation. The primary external resonance simultaneously with the internal one are investigated to establish the solvability conditions and the modulation equations. The equilibrium points are obtained and represented graphically to obtain the possible steady state solutions near resonances in framework of the stability conditions of these solutions. The graphical representations of the time history together with the amplitude and phases of the dynamical system are represented in some plots to describe the motion of the system at any instance.

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