

Research on the nonlinear vibration characteristics of cantilever under a moving load

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A structure with a cavity, when it works, a mass moves in high speed pushed by high-pressure gas, it will cause strongly nonlinear vibration. For obtaining the disciplinary of structure vibration, this structure is considered as a cantilever in the paper, on that base, its transverse vibration equation has been established, and forced response can be figured out by using modal analysis method. The vibration characteristics of the structure were numerically simulated in different working conditions, besides, two situations that the structure with or without gas pressure have been compared. In solving process, the displacement velocity and acceleration of projectile are real experimental data. The simulation results indicate that static offset affects vibration characteristics very much, with the increasing of the mass's initializing speed, the amplitude of the structure's vibration is lower without static offset, and the effect of gas pressure can decrease the amplitude of vibration considerably.

Biography

Zhu Da-wei is 25 years old, and still studying for Ph.D degree in Nanjing University of Science and Technology. Dynamics of artillery is major, we have a work group of 21 students and 4 professors. This is the first paper.

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