عنوان مقاله:

Vibration Behavior of the Planetary Gear System by Considering the Fixed Output

محل انتشار:

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نویسندگان:

Ali Shahabi - *Department of Mechanical Engineering, University of Sistan and Baluchestan, Zahedan, Iran*
Nedayedanesh Institute of Higher Education of Hormozgan, Bandar Abbas, Iran

Amir Hossein Kazemian - *Department of Mechanical Engineering, University of Sistan and Baluchestan, Zahedan, Iran*

خلاصه مقاله:

This work studies on analytical model of the single–stage spur planetary gear in form of lumped–parameter model. It includes key nonlinear factors of planetary gear vibration such as mesh stiffness and backlash of meshing gears. The planetary gear set is modeled as a set of lumped masses and springs and dynamic model of the planetary gear set is presented. Nonlinear equations of motion are presented for each component and each component has three degrees of freedom in planar motion. We have numerically evaluated a set of linear and nonlinear equations to obtain natural frequencies and analysis of vibration behavior of the system under nonlinear factors and fixed output. In previous researches, natural frequencies of planetary gears were evaluated from two points of view: the first one considered fixed output for planetary gears and the second one consists of free rotational output. In this research, the influence of the output flexibility is evaluated on natural frequencies of the planetary gear. Meanwhile, by considering the fixed output, vibration behavior of the nonlinear system is investigated. Results show that the most important effect of the output flexibility is on the principal natural frequency. Because of chaotic phenomenon, vibration behavior of components in translational directions is different.

کلمات کلیدی:

Backlash, Chaotic phenomenon, Mesh stiffness, Natural frequency, Spur planetary gear