

# 應用時變剛性離散模式之單級增速行星齒輪系統動態分析

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## 摘要

This study investigates modal and dynamic characteristic of a single stage planetary gear system under dynamic excitation. Two approaches which respectively use a discrete and a finite element model are used to obtain modal and dynamic responses. In the discrete model, the equivalent varying mesh stiffnesses and mesh phases among external and internal helical gear pairs are derived. The geometry and assembly constraints in the planetary gear sets are also established. Accordingly, equations of dynamic analyses for single stage planetary gearings are derived. The stiffness models for ball bearings and shafts are also included. Applied excitations on the input and output shafts are also added. Therefore, numerical dynamic responses of planetary gear gearings are solved. To verification, a comparison of the modal responses of the two models is included. Finally, basic dynamic responses under two kinds of excitations are analyzed. The proposed approach using a time varying discrete model expected to facilitating the dynamic analysis of the planetary gear increaser under the fluctuating excitation is attained

關鍵字 : Planetary gear system, Dynamics, Wind turbine, Mesh stiffness, Discrete model