Dynamic Analysis of Spur Gear Pairs Including the Lubrication Effect Using a Time-Varying Model

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Abstract

The study investigates dynamics of spur gear pairs incorporating effect. Both the elastohydro-dynamic lubrication and the squezzed film theories are employed to model the lubrication film effect by including an equivalent dynamic damping factor. Besides, time-verying property of ortating gear system is taken in account by instantaneously updating the meshing stiffness, the meshing force, and the damping factor during each calculation step for the governing equation. Finally, influences of the lubricant viscosity, the applied torque, and the addendum medification factor on the lubricating and the dynamic responses of the spur gear system are investigated. The analyzed result demonstrates the ersentiality of oil lubrication in the gearing dynamies.

Keyword：Spur gear, Lubrication, Dynamic analysis, Addendum correction factor