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6. Transient phenomena in elastohydrodynamic lubrication

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Abstract

Tribological contacts of machine components working in the elastohydrodynamic regime always experience transient conditions due to variation of speed, load, geometry, or vibrations generated within the contacts or transmitted from the environment. Given the fact that the contacting bodies and lubricant, together with the other components of the mechanisms or machine, form a dynamic system comprising of springs and dampers, this will respond to dissipate the instability caused by the variation of the above parameters. At the lubricating film level, this is done by constant-amplitude, or dampened oscillations of its thickness.

This chapter is a review of experimental research carried out in the past decade into the non-steady state elastohydrodynamic lubrication, including transient loading, sudden variation of entrainment speed and variation of micro-geometry.