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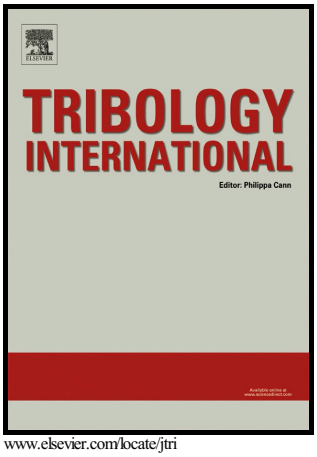

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Numerical Dynamic Analysis of Reciprocating Compressor Mechanism. Parametric Studies for Optimization Purposes.

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Abstract

A complete numerical dynamic analysis of reciprocating compressor mechanism is presented, coupling the instantaneous pressure in the compression chamber, the electric motor torque and the hydrodynamic reactions, which arise from the piston and crankshaft secondary movements. Additionally, non-constant crankshaft angular velocity and the piston and crankshaft misalignment torques have also been considered. Two sensitivity analyses have been carried out to prove that neither the inertial forces in the directions of the secondary movements, nor the oscillations of the angular velocity produce significant differences in the compressor behaviour. Finally, a set of parametric studies have been developed to evaluate the influence of geometrical parameters in the stability of the secondary movements, the friction power losses and the compressor consumption.

Keywords: Numerical analysis, Reciprocating, Lubrication, Journal

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