Bayada, G.; **Chambat, M.**

Sur quelques modélisations de la zone de cavitation en lubrification hydrodynamique. (Some modelling of the cavitation region in hydrodynamic lubrication). (French) Zbl 0621.76030

J. Méc. Théor. Appl. 5, 703-729 (1986).

After a survey of some classical models, we study a new approach to the free boundary problem of the cavitation in hydrodynamic lubrication. This leads to a partial differential equation with a discontinuous nonlinearity; a mathematical study is carried out for two usual shapes of bearings. A finite elements procedure allows us to compute the operational data for a lubricated system with the new model and to compare them with those computed with another model based upon variational inequalities.

MSC:

76D08	Lubrication theory
49S05	Variational principles of physics (should also be assigned at least one other classification number in Section 49-XX)
76M99	Basic methods in fluid mechanics

Keywords:

Sommerfeld model; Reynolds model; free boundary problem; cavitation; hydrodynamic lubrication; bearings; finite elements procedure; lubricated system; variational inequalities