

**Bayada, G.; Durany, J.; Vázquez, C.**

**Existence of a solution for a lubrication problem in elastic journal- bearing devices with thin bearing.** (English) Zbl 0820.35110

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Summary: A particular elastohydrodynamic lubrication problem is modelled in this work. The presence of elasticity, lubrication and cavitation calls for a nonlinear coupled system of variational equations. The existence of a solution is deduced by means of a constructive algorithm that decouples the biharmonic equation of the elastic hinged plate and the lubrication- cavitation Elrod-Adams free boundary problem.

**MSC:**

**35Q35** PDEs in connection with fluid mechanics

**76D08** Lubrication theory

**35J60** Nonlinear elliptic equations

**35R35** Free boundary problems for PDEs

Cited in **10** Documents

**Keywords:**

elastohydrodynamic lubrication problem; variational equations; existence; constructive algorithm

**Full Text:** [DOI](#)

**References:**

- [1] 'Problemas de Frontera Libre en Teoría de Lubricación', Ph.D. Thesis, University Complutense of Madrid, Spain, 1986.
- [2] Bayada, Appl. Math. Optim. 14 pp 73– (1986)
- [3] Bayada, Jour. Mec. Th. Appl. 5 pp 703– (1986)
- [4] Brezis, C.R. Acad. Sci. Paris. 187 pp 711– (1978)
- [5] Cimatti, Appl. Math. Optim. 10 pp 223– (1983)
- [6] Cimatti, Int. J. Eng. Sci. 24 pp 827– (1986)
- [7] and , Elastohydrodynamic Lubrication, Pergamon, Oxford, 1966.
- [8] and , An Introduction to Variational Inequalities and Their Applications, Academic Press, New York, 1980.
- [9] Perturbations Singulieres dans les Problèmes aux Limites et en Controle Optimal, Lecture Notes in Mathematics, Vol. 323, Springer, Berlin, 1973. · [doi:10.1007/BFb0060528](https://doi.org/10.1007/BFb0060528)
- [10] Oden, Int. J. Eng. Sci. 23 pp 207– (1985)
- [11] Variational Methods in Mathematics Science and Engineering, Reidel, Dordrecht, Publishing Company 1977. · [doi:10.1007/978-94-011-6450-4](https://doi.org/10.1007/978-94-011-6450-4)
- [12] Reynolds, Phil. Trans. Roy. Soc. London A117 pp 157– (1886)
- [13] Savage, J. Fluid Mech. 80 pp 734– (1977)
- [14] 'Análisis matemático y resolución numérica de problemas de lubricación con cavitación', Ph.D. Thesis, University of Santiago, Spain, 1992.

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