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Numerical and Analytical Study of Frictional Contact Problems in Thermo-Viscoelastic

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Abstract

This study investigates a quasistatic frictional contact problem involving a thermo-viscoelastic body in interaction with a thermally conductive foundation. The mechanical behavior is described by a Kelvin–Voigt constitutive model for the displacement field, while heat conduction is governed by a temperature-dependent parameter. The contact conditions incorporate an instantaneous normal response and a unilateral constraint on the tangential velocity, reflecting a Coulomb-type dry friction law. A variational formulation of the problem is developed, and the existence of a weak solution is established through a combination of monotone operator theory and the Banach fixed-point theorem. The effectiveness of the proposed framework is further demonstrated through a series of numerical simulations that highlight the performance and applicability of the method.

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References

- [1] W. Han, and M. Sofonea, Evolutionary Variational Inequalities Arising In Viscoelastic Contact Problems, SIAM J. NUMER. ANAL. Vol. 38. No. 2, pp, 556-579
- [2] M. Alaoui, E.-H. Essoufi and M. Bouallala, Quasistatic thermo-electro-viscoelastic contact problem with Signorini and Tresca's friction, Electronic Journal of Differential Equations Vol. 05, pp. 1-21, (2019)
- [3] M. Barbotou, Y. Ouafik and M. Sofonea. Numerical modelling of a dynamic contact problem with normal damped response and unilateral constraint, Journal of Theoretical and Applied Mechanics, 56(2), 483–496, (2018)