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Variational and Numerical Analysis of Electro-Elastic Contact Problems

Communication Info

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Abstract

This paper addresses a frictionless contact problem involving an electro-elastic body interacting with a semi-insulating rigid-plastic foundation. The model is cast in a variational setting with displacement and electric potential as the state variables. The well-posedness of the problem is demonstrated via Banach's fixed-point theorem. Numerical approximations are then developed to illustrate the theoretical results and to analyze the electro-mechanical behavior under contact conditions.

References

[1] M. Sofonea and Y. B. Xiao, Well-posedness of minimization problems in contact mechanics Journal of Optimization Theory and Applications, 188, 2021, 650-672.
[2] T. Chen, H. Rong and M. Sofonea, Analysis and control of an electro-elastic contact problem Mathematics and Mechanics of Solids, 27 (5), 2021, 813-827.
[3] EL-H. Essoufi and M. Bouallala, Analysis for Unilateral Contact Problem with Coulomb's Friction in Thermo-Electro-Visco-Elasticity Filomat, 36:13, 2022, 4443–4457.
[4] EL-H. Essoufi , M. Alaoui and M. Bouallala, Quasistatic thermo-electro-viscoelastic contact problem with Signorini and Tresca's friction Electronic Journal of Differential Equations, 05, 2019, 1-21.
[5] Y. Ouafik, Numerical analysis of a frictional contact problem for thermo-electro-elastic materials Journal of Theoretical and Applied Mechanics, 58(3), 2020, 673-683.