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Continuous contact problem of thermoelectric layer pressed by rigid punch. (English)
Zbl 07419782

Summary: In this study, the continuous contact problem of thermoelectric layer resting on a rigid substrate and loaded by a rigid punch is examined. Considering the body force of the thermoelectric layer, the model of stress distribution between thermoelectric layer and rigid layer is established. The general expressions for the stress between the thermoelectric layer and the substrate are given. Using the boundary conditions, the singular integral equation of the stress distribution is obtained and solved by Gauss-Chebyshev integral formula. The numerical results of the stress distribution between the rigid punch and the thermoelectric layer are obtained. It is found that the stress between the rigid punch and the thermoelectric layer exhibits singularity at the edge of the rigid punch. The influence of the parameters of the rigid punch and the thermoelectric layer on the critical load factor between the thermoelectric layer and the substrate is analyzed. The results show that the larger rigid punch width and the body force of the thermoelectric layer make it difficult to separate the thermoelectric layer from the rigid substrate. The results of this paper will provide a reference for studying the contact behavior of thermoelectric materials.

MSC:
74Bxx Elastic materials
74Hxx Dynamical problems in solid mechanics
45Exx Singular integral equations

Keywords:
thermoelectric layer; rigid punch; continuous contact problem; critical load factor; singular integral equation

References:

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