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A COMPUTATIONAL METHOD WITH FINITE ELEMENTS FOR A COUPLED SOLUTION BETWEEN MECHANIC AND THERMIC CONTACT PROBLEMS

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ABSTRACT. This paper proposes a computational method for analysing the behaviour of two elastic bodies coming into contact with friction, obeying volume forces of density, surface tractions of density, and thermal load. Thermal load results from the computation of the distribution of the thermal field in the two bodies, assuming the existence of a heat source. In this computation, attention is concentrated on contact problem in elasticity and on thermal transfer through the contact zone, using contact finite element and the thermal finite contact element.

Mechanical contact will be analysed in following incremental stages. Firstly, the displacement field will be determined from the forces and thermal loads. Here, too, attention is concentrated on the contact zone, where use will be made of finite contact element which will be a model of: the condition of contact, the law of friction and the geometry of the contact interfaces. Then there follows the alternative and incremental computation of the displacement field and thermal field, since the thermal contact resistence and geometry of the contact zone change. In the liniarization of the set of equations use is made of the Newton-Raphson method, and a consistent technique which implies computational efficiency.