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INVERSE PROBLEM ESTIMATION OF A TWO-DIMENSIONAL THERMAL CONTACT CONDUCTANCE USING THE RECIPROCITY FUNCTIONAL

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In this paper, a non-iterative method, based on a reciprocity functional approach, is used to estimate a two-dimensional thermal contact conductance between two bodies without using intrusive measures. A three-dimensional steady state heat conduction problem is considered, where the contact between the two bodies varies along the x and y coordinates. The method consists of two stages: initially, two auxiliary problems, that do not depend on the thermal contact conductance, are solved by the finite differences method and, after this step, it is possible to obtain both the temperature jump and the heat flux at the interface, through the use of the reciprocity functional. With these results, it is possible to estimate the thermal contact resistance. Results considering simulated measurements are presented, where the influence of the measurement noises are considered.