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A Nonlinear Interface Problem with Nonmonotone Set-Valued Transmission Conditions on an Unbounded Domain

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Abstract: A nonlinear interface problem on an unbounded domain with nonmonotone set-valued transmission conditions is analyzed. The investigated problem involves a nonlinear monotone partial differential equation in the interior domain and the Laplacian in the exterior domain. Such a scalar interface problem models nonmonotone frictional contact of elastic infinite media. The variational formulation of the interface problem leads to a hemivariational inequality, which lives on the unbounded domain, and so cannot be treated numerically in a direct way. By boundary integral methods the problem is transformed and a novel hemivariational inequality is obtained that lives on the interior domain and on the coupling boundary, only. Thus for discretization the coupling of finite elements and boundary elements is the method of choice.