

Symmetry and exact solutions of a class of nonlinear boundary value problems with free boundaries

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The main subject of my report is an application of Lie symmetry to boundary value problems (BVPs) with free boundaries. I will propose a new definition of Lie invariance for BVPs by the generalization of existing those on much wider class of BVPs. The class of (1+1)–dimensional nonlinear BVPs, modeling the process of melting and evaporation of metals will be studied in details. Using the definition proposed, we will find all possible Lie symmetries the problem under study. One also will be shown how to construct exact solutions of the problem with correctly-specified coefficients by using the results obtained from Lie symmetry analysis of the problem.