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Some free-boundary problems and their control

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Abstract

This talk is concerned with the theoretical and numerical control of several free-boundary problems. Among them, we will consider the one-phase and two-phase Stefan problems with distributed or boundary controls. We will prove some local results. More precisely, it will be shown that there exist controls such that an associated dependent variable (resp. an associated interface) is steered to zero (resp. to a prescribed location) provided the initial data and interface position are sufficiently close to the targets. We will also present some numerical methods for the computation of null controls and will illustrate the techniques with several numerical experiments. Several parts of the work have been done in collaboration with J. Límaco, S. de Menezes, D.A. Souza and R.K.C. Araújo.

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