

definition remark Example  $\operatorname{erfc}$

# Two-phase Stefan problem with nonlinear thermal coefficients and a convective boundary condition

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May 5, 2020

## Abstract

We consider a non-linear two-phase unidimensional Stefan problem, which consists on a solidification process, for a semi-infinite material  $x > 0$ , with phase change temperature  $T_1$ , an initial temperature  $T_2 > T_1$  and a convective boundary condition imposed at the fixed face  $x = 0$  characterized by a heat transfer coefficient  $h > 0$ . We assume that the volumetric heat capacity and the thermal conductivity are particular nonlinear functions of the temperature in both solid and liquid phases and they verify a Storm-type relation. A certain inequality on the coefficient  $h$  is established in order to get an instantaneous phase change process. We determine sufficient conditions on the parameters of the problem in order to prove the existence and uniqueness of a parametric explicit solution for the Stefan problem.

## Hosted file

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