The Stefan Problem

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Introduction to Stefan-Type Problems - UniTrento

Problems on Stefan Boltzmann Law. Example: A body of emissivity (e = 0.75), the surface area of 300 cm 2 and temperature 227 ºC are kept in a room at temperature 27 ºC. Using the Stephens Boltzmann law, calculate the initial value of net power emitted by the body. Using equation (3); P = rsA (T 4 – T 0 4)

The Classical Stefan Problem - 2nd Edition

phases problems is probably better understood in terms of the weak formulation of the Stefan problem, which is discussed below in Chapter 2. We remark here that, actually, one phase problems are just two phases problems with one phase at constant temperature, so that the discussion in Chapter 2 applies to them too. Remark 1.4.

The Stefan Problem: Polar Exploration and the Mathematics ...

classes, Stefan problems are systems of di usion or heat-conduction where the bound-aries between the di erent phases in the system change over time. For example, the solidi cation of water into ice can be formulated as a Stefan problem. Unfortunately, because Stefan problems can become so di cult to handle, there is often no way to ana-

The Classical Stefan Problem, Volume 45 - 1st Edition

The Classical Stefan Problem: Basic Concepts, Modelling and Analysis with Quasi-Analytical Solutions and Methods, New Edition, provides fundamental theory, concepts, modelling and analysis of the physical, mathematical, thermodynamical and metallurgical properties of classical Stefan and Stefan-like problems as applied to heat transfer problems involving phase-changes, such as from liquid to ...

The Supercooled Stefan Problem in One Dimension

Roughly speaking, the Stefan problem consists on determining the temperature distribution in a medium undergoing a phase change. This book describes the analytical side of the problem from the first existence and uniqueness results obtained in the first half of the twentieth to approximately 1987.

Stefan Boltzmann Law - Derivation, Formula, Equation, Examples

phase Stefan problem which, in a certain sense, is a generalization of the problem considered here. In particular existence (but not uniqueness) as well as certain regularity properties were established. All of the above mentioned concerns only the problem of a single boundary.

One-Dimensional Stefan Problem - Harvey Mudd College

problem associated to the basic Stefan model, and also for a problem with phase relaxation and nonlinear heat-diffusion. Some basic analytical notions are also briefly illustrated: convex calculus, maximal monotonicity, accretiveness, and others.

Hanzawa : Classical solutions of the Stefan problem

Reduction to one dimension. The multi-phase stationary problem. A filtration analog to the Stefan problem The single-phase Stefan problem for a general one-dimensional equation of parabolic type. The generalized solution of the Stefan problem Numerical methods for the solution of the Stefan problem Problems: Series Title:

The Classical Stefan Problem | ScienceDirect
called Stefan problems. However, their rich nonlinear behavior, has attracted substantial mathematical interest (e.g. [1]), and their ubiquity in fields ranging from geology to metallurgy stimulates continual rediscovery of Stefan's work, but rarely a scrutiny of its curious history.

Stefan condition - Encyclopedia of Mathematics
The generalized solution of the Stefan problem . 321: 18 . 190: Proof of Theorem 11 The case fi0 z 0 . 199: 25 . 203: 5 . 205: 37 . 210: SoLUTION OF PROBLEMs A1 AND . 222: 1 . 235: THE DOUBLELAYER STEFAN PROBLEM WITH . 238: High speed flow of a solid body in a viscous incompressible . 351:

Stefan problem - Wikipedia
The parabolic-elliptic Stefan problems have been analysed mostly for their weak solutions. Only few studies have been reported on the analysis of the classical solutions of these problems. The regularity of the classical solution of the two-phase one-dimensional degenerate Stefan problem described in (6.2.13)–(6.2.17) has been discussed in [174].Let the regions $-1<x<S(t)$ and $S(t)<x<1$ be ...

Stefan Problem - an overview | ScienceDirect Topics
The Classical Stefan Problem: Basic Concepts, Modelling and Analysis with Quasi-Analytical Solutions and Methods, New Edition, provides fundamental theory, concepts, modelling and analysis of the physical, mathematical, thermodynamical and metallurgical properties of classical Stefan and Stefan-like problems as applied to heat transfer problems involving phase-changes, such as from liquid to ...

The Stefan Problem (Degruyter Expositions in Mathematics ...
A classical illustration of the Stefan condition and of related problems can be found in . Many generalizations of the Stefan condition have been considered in the literature. For instance, the coefficients may depend on space and time, or higher-order derivatives of may appear on the right-hand side, even in a non-linear way (see e.g. [a5] , [a6]).

The Stefan Problem - L. I. Rubinshteĭn - Google Books
Two Stefan problems for a non-classical heat equation with nonlinear thermal coefficients Briozzo, Adriana C. and Natale, María Fernanda, Differential and Integral Equations, 2014; The Stefan problem with convection and Joule's heating Shillor, Meir and Xu, Xiangsheng, Advances in Differential Equations, 1997

NUMERICAL SOLUTION OF 2D STEFAN PROBLEM
The aim of the Expositions is to present new and important developments in pure and applied mathematics. Well established in the community over more than two decades, the series offers a large library of mathematical works, including several important classics. The volumes supply thorough and detailed expositions of the methods and ideas essential to the topics in question.

The Stefan problem, (eBook, 1971) [WorldCat.org]
The numerical solution of 2D Stefan problem is discussed. The Stefan model describes the solidification of pure metals or eutectic alloys in macro scale. From the numerical view point the solution of this task is very complex, in particular, for 2D or 3D domains. In literature one can find the algorithms basing on the substitution of the Stefan ...

Lecture notes on the Stefan problem
Stefan problems have some characteristics that are typical of them, but certain problems arising in fields such as mathematical physics and engineering also exhibit characteristics similar to them. The term ``classical" distinguishes the formulation of these problems from their weak formulation, in which the solution need not possess classical derivatives.

The Stefan Problem
Also, Stefan problems can be applied to describe phase transformations. The Stefan problem also has a rich inverse theory; in such problems, the meting depth (or curve or hypersurface) s is the known datum and the problem is to find u or f. Advanced forms of Stefan problem

The Stefan Problem - Richard K. Neumann, Anvarbek ...
The Stefan problem in the classical statement is a mathematical model of the propagation of heat in a medium, being in different phase states, e.g., liquid and solid ones Due to the melting or