Chapter

Variational Method for Solving the Time-Fractal Heat Conduction Problem in the Claydite-Block Construction

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References (27)

Abstract

Mathematical models of the heat conduction problem in the claydite-block construction with taking into account the fractal structure of the material is constructed. Integro-differentiation apparatus of fractional order to take into account the fractal structure of the material was used. The variational formulation of the problem was constructed. The variational method for obtaining an approximate solution of the considered problem was proposed. The results of the numerical experiments of studying the thermal conductivity of claydite-block construction depending on the time, wall thickness and materials of different fractions were obtained. Analyzing the founded distributions of temperature fields allows us to more accurately reflect the real speed of the process.KeywordsFractal structureHeat conductionVariational formulationFinite element methodGalerkin's method

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Finite Element Calculation of the Linear Elasticity Problem for Biomaterials with Fractal Structure

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Application of the Laplace transform to nonlinear transient problems

March 1991 · Applied Mathematical Modelling

Han-Taw Chen · Jae-Yuh Lin

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Heat conduction with a temperature-dependent thermal conductivity coefficient

December 1970 · Journal of Engineering Physics

Enrico Lorencini

A variational method is employed to solve stationary and nonstationary heat conduction problems when the thermal conductivity coefficient is temperature-dependent and the heat generation function of the medium is arbitrary.

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Simulation of Permafrost Thaw Behavior at Prudhoe Bay

March 1978 · Journal of Petroleum Technology

C. J. Lin · J. D. Wheeler

This paper presents mathematical models to simulate transient heat flow within the wellbore and in the permafrost during drilling, production, antifreeze-back. Calculated temperatures agree well with measurements taken in the wellbore and in the permafrost during field tests at Prudhoe Bay. Production-thaw predictions are presented for a typical Prudhoe Bay well with three different insulation ... [Show full abstract]

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Use of a variational method to solve a heat conduction problem with internal heat sources

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A. M. Fain

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December 2005

J.E. Akin

This chapter presents the details of formulating the solution to the steady-state heat conduction problem. The approach is general, however, and by redefining the physical quantities involved the formulation is equally applicable to other problems involving the Poisson equation. The physical behavior governing a variety of problems in engineering can be described as scalar field problems. That ... [Show full abstract]

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