Exact Solutions Of Nonlinear Heat And Mass Transfer Equations

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Exact Solutions Of Nonlinear Heat

EXACT SOLUTIONS OF NONLINEAR HEAT- AND MASS-TRANSFER EQUATIONS 405 This equation admits exact solutions of form (7) but has no exact solutions of form (5). C(x, t) = 0(x)Zl(t) + Z2(t), (8) where Zl(t) = exp(K0t) and the function Z2(t) is deter- mined from the first-order ordinary differential equa- tion X2 = KoZ2 + O(t).

Exact solutions of nonlinear heat- and mass-transfer equations

108 STUDY OF EXACT SOLUTIONS OF NONLINEAR HEAT EQUATIONS. pinhead, oraround10milligrams, iscapableofreleasingtheenergyequivalentto burning a barrel of oil (that is, chemically combining its hydrocarbon molecules with oxygen). Fusion reactions combine lightweight atoms, such as hydrogen, together to form larger ones.

Study of exact solutions of nonlinear heat equations - SciELO

New exact solutions of one-, two-, and three-dimensional heat equations are obtained. Anisotropic media with a nonlinear heat source of general form are considered for the case in which the main thermal diffusivities show a power or an exponential dependence on the spatial coordinates.

Exact solutions of nonlinear heat- and mass-transfer ...

In this article, we analyze the exact solutions of the nonlinear equation of heat conduction problem with variable transfer coefficients which is the problem of ICF. Mathematical subject ...

(PDF) Study of exact solutions of nonlinear heat equations

Abstract— Exact analytical solutions of three nonlinear heat transfer models of practical interests namely, steady state heat conduction in a rod, transient cooling of a lumped system and steady state heat transfer from a rectangular fin into the free space by the radiation mechanism, have been obtained.

Exact Analytical Solutions of Three Nonlinear Heat ...

analytical solution of three nonlinear heat transfer problems which have nonlinear temperature dependent terms. The first problem represents the steady state heat conduction process in a metallic rod and is described by a nonlinear BVP (boundary value problem) in a second order ODE (ordinary differential equation).

Exact Solutions of Three Nonlinear Heat Transfer Problems

The exact solutions of the nonlinear heat (porous medium) equation are constructed. We obtain a new class of the heat wave type solutions the construction of which is reduced to the Cauchy problems for nonlinear second order di erential equations with a singularity.

Some Exact Solutions of a Heat Wave Type of a Nonlinear ...

Symmetry Reductions of a Nonlinear Heat Equation 1 1 Introduction The nonlinear heat equation u t = u xx +f(u), (1.1) where xand tare the independent variables, f(u) is an arbitrary sufficiently differentiable function and subscripts denote partial derivatives, arises in several important physical applications including

Symmetry Reductions and Exact Solutions of a class of ...

In this paper, we will obtain the general exact solution of the of nonlinear heat transfer in rectangular straight fin using λ-symmetry and Lie point symmetry methods. The following sections will be organized as follows: In section 2, the fin problem description is introduced.

Exact implicit Solution of Nonlinear Heat Transfer in ...

Nonlinear heat equation of general form. This equation occurs in nonlinear problems of heat and mass transfer and flows in porous media. 1–. Traveling-wave solution in implicit form: k2 Z f(w)dw ,w +C1 =kx+,t+C2, where C1, C2, k, and , are arbitrary constants. To , =0there corresponds a stationary solution. 2–. Self-similar solution: w =w(z), z =xt−1=2,

Nonlinear Heat Equation - EqWorld
Setting n = 3, we obtain the solutions of the standard form of the nonlinear heat conduction equation as follows: (17) $u_1(x,t) = (a_0 \exp[\pm \frac{1}{2} a x - \frac{1}{2} t] + a_0) - \frac{1}{2}$, (18) $u_2(x,t) = (b_0 \exp[\pm \frac{1}{2} a x - \frac{1}{2} t]) - \frac{1}{2}$.

Exact solutions for the generalized nonlinear heat ...
The exact solutions of classical Emden-Fowler equation, by means of appropriate transformations of discrete group analysis is transformed into the exact solution of nonlinear applied problem of ICF. This approach is effective to find a new integrable equations which thus far, could not be integrated using the classical methods.

Exact Solutions Of Nonlinear Heat And Mass Transfer Equations

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