Kotova, E. V.; **Kudinov, V. A.**; **Stefanyuk, E. V.**; **Tarabrina, T. B.**

Method of decreasing the order of a partial differential equation by reducing to two ordinary differential equations. (English. Russian original) Zbl 1402.35016

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Summary: Using additional unknown functions and additional boundary conditions in the integral method of heat balance, we obtain approximate analytic solutions to the non-stationary thermal conductivity problem for an infinite solid cylinder that allow to estimate the temperature state practically in the whole time range of the non-stationary process. The thermal conducting process is divided into two stages with respect to time. The initial problem for the partial differential equation is represented in the form of two problems, in which the integration is performed over ordinary differential equations with respect to corresponding additional unknown functions. This method allows to simplify substantially the solving process of the initial problem by reducing it to the sequential solution of two problems, in each of them additional boundary conditions are used.

MSC:

35A24 Methods of ordinary differential equations applied to PDEs
35A35 Theoretical approximation in context of PDEs

Keywords:

non-stationary thermal conductivity; infinite solid cylinder; integral method of heat balance; additional boundary conditions; approximate analytic solutions

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