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CONSTRUCTION OF DYNAMICALLY ADAPTING COMPUTATIONAL GRIDS IN SYSTEMS OF DIFFERENTIAL EQUATIONS DESCRIBING THE NON-EQUILIBRIUM PROCESSES

MAZHUKIN A.V., KOROLEVA O.N.

M.V. Keldysh Institute for Applied Mathematics of RAS,
4a Miusskaya sqr., 125047 Moscow, Russia,
e-mail: vim@modhef.ru

Abstract. The processes occurring in solid targets (metals, semiconductors) initiated by pulsed flows of condensed energy is described by two-temperature model (TTM). The simplest TTM model for metals consists of two, and for semiconductors of three non-linear parabolic equations. Ultrafast impact (pico-femtosecond pulse duration) predetermines the appearance of large solution gradients that require in numerical solution application of computational grids with dynamic adaptation. Transition to an arbitrary non-stationary system of coordinates, the velocity of which is unknown and depends on the desired solution is the basis of the construction of a dynamically adaptive grids. Velocity of the system of coordinates for the numerical discretization is used as a function that control the motion of grid nodes . Agreed change of movement of grid nodes with the solution is achieved by constructing of transformation function derived from the principle of quasi-stationarity.
Simulation of some specific regimes pulsed heating, melting and evaporation of metals (Al), and semiconductors (Si), that use grids with automatic distribution of nodes.