

Algorithms for Generation of Three-dimensional Grids in the Domains of Revolution for Multiblock Constructions. ¹

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ABSTRACT

We describe the algorithms for generation of three-dimensional structured grids for multivariate hydrodynamic simulation [1] in the domains of revolution defined by rotating a generating curve given in the plane x, z about the axis z through the angle φ ($0 < \varphi_0 \leq \varphi \leq \pi$) for the case of multiblock constructions. The generating curve can be composed of straight line segments and arcs of circles or ellipses. Algorithms for calculation of three-dimensional structured grids in the domains of revolution for the case of single-block constructions has been suggested in [2]. Algorithms from [2] are not reduced to the rotation of two-dimensional grids about the axis and are developed within the approach [3]. They are designed for generating structured optimal grids [3] (nondegenerate, closed to uniform orthogonal grids). Algorithms [2] admit different ways [4] of node calculation on the boundary of the domains of revolution. Suggested algorithms are the further development of algorithms [2]. New algorithms allow us to fix the generating curve points on the boundary of the domain of revolution in the calculation of grids. This gives us the opportunity to fix the sharp turn of the generating curve. The algorithms allow us also to calculate block-structured grids for the constructions composed of different materials. Examples of grids are demonstrated. The testing of grids on nondegeneracy is carried out according to [5].

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¹This work was supported by the Russian Foundation for Basic Research, project 08-01-00327.