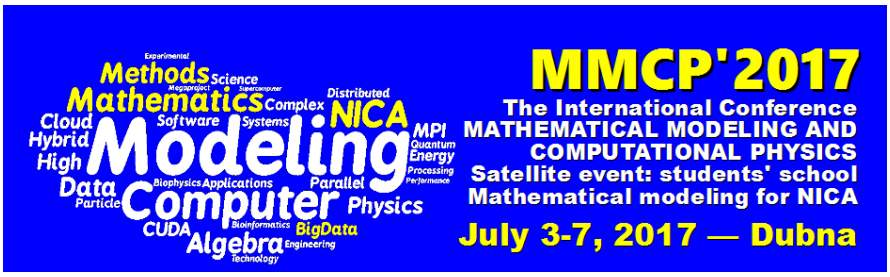

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Modification of Adaptive Artificial Viscosity for Solution of Gasdynamic Problems on Parallel Computer Systems

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In work the modified method of adaptive artificial viscosity so-called AIV method is considered. Earlier developed AIV method belongs to schemes a predictor - corrector type. In the procedure of this method between a predictor and the proofreader there is a stage of definition of areas of physical ruptures of the solution, in particular, of areas of an arrangement of shock waves and numerical oscillations. In these areas artificial viscosity which provides monotony of the numerical decision is entered. At the solution of concrete problems on parallel computer systems this method demanded unfairly large number of transfers of data between subareas of computational domain. The modified AIV method is developed for overcoming this problem. The new variant of the AIV method consists of two stages. At the first stage the analysis of the numerical solution on the previous temporary layer is made and amendments to flows for the purpose of ensuring monotony of the solution are calculated. The second stage is responsible for calculations of all physical quantities on the following temporary layer. The modified AIV method has been applied to the solution of the equations of gas dynamics in the presence of shock waves. The carried-out calculations have shown that on a shock wave the quantity of intervals for resolution of her front can increase all by unit. In other areas, in particular, on a depression wave the numerical decision even approaches the exact solution of a task closer. Thus, the offered modification doesn't worsen the AIV method, and at realization on parallel computer systems significantly reduces the overhead costs connected with introduction of adaptive artificial viscosity.

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