HERMITE CHARACTERISTIC SCHEME FOR LINEAR INHOGENEOUS TRANSPORT EQUATION

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The interpolation-characteristic scheme for the numerical solution of the inhomogeneous transport equation is constructed. The scheme is based on Hermite interpolation to reconstruction the value of unknown function at the point of intersection of the backward characteristic with the cell edges. Hermite interpolation to regeneration the values of the function uses not only the nodal values of the function, but also values of its derivative. In contrary of previous works, also based on Hermitian interpolation, the differential continuation of the transport equation is not used to transfer information about the derivatives to the next time layer. The transport equation is characterized by existence of an discontinious solutions and derivatives of such kind of solution should be considered as an generalised function. The relationship between the integral means, nodal values and derivatives according to the Euler-Maclaurin formula is used. The third-order convergence of the difference scheme for smooth solutions is shown. The dissipative and dispersion properties of the scheme are considered on numerical examples of solutions with decreasing smoothness.

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