



A FINITE VOLUME METHOD WITH MATRIX SIGNE FOR SULICIU MODEL

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Abstract. We propose a class of finite volume methods for the numerical solution of the Suliciu relaxation model called the SRNHS scheme (Non-Homogeneous Riemann Solveur with Matrix Sign), the approach relies on a two-step approximation integration of the conservation laws over finite volume cells. This results in the flux Jacobean's sign matrix appearing in the first step, which causes the characteristic variables to sort of upwind. The last or upgrading stage does not rely on numerical flux calculations, but just on physical flux calculations. This approach is non-oscillatory, well-balanced, and appropriate for this model. A number of test cases in one space dimension are used to demonstrate the suggested technique, these examples show how the SRNHS scheme can produce accurate results for the Suliciu relaxation model and demonstrate its high resolution. Ultimately, the SRNHS approach can be used to solve a large number of other models in applied research in advanced physics and applied science.

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