

HIGH ORDER ADER SCHEMES FOR AN ATHEROSCLEROSIS MODEL

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ABSTRACT. We study an advection – diffusion – reaction mathematical model for the evolution of atherosclerosis as an inflammation process. A high order finite volume formulation based on ADER methodology is developed to approximate the time-dependent solutions of the model proposed by El Khatib et al. (2007).

Concerning the asymptotic behaviour of the solutions, the numerical examples show that a small perturbation of a healthy steady state makes the system evolve to a disease equilibrium for some choice of the parameters. We apply our numerical scheme to determine if each initial datum in a huge family of initial data is attracted by a disease equilibrium or by a healthy steady state. Simultaneously we compute the steady states.

Keywords: finite volume formulation, reaction diffusion models, asymptotic behaviour, steady states, atherosclerosis.

Mathematics Subject Classifications (2000): 35B40, 35K57, 35Q92, 65M08, 92C50.

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