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Numerical analysis for a diffusive SIS epidemic model with repulsive infected-taxis

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Abstract

This talk is devoted to the numerical study of a reaction-diffusion SIS epidemic model with repulsive infected-taxis. This model describes the dynamics of a population, in which susceptible people v may want to stay away from infective one u. By using a regularization technique, we propose a finite element fully discrete scheme using a nonlinear discrete diffusion, which preserves some qualitative properties such as well-posedness, conservation of the total mass, point-wise and uniform estimates for u, positivity for u and approximated positivity for v. The key point to deduce the approximated positivity property, crucial to avoid the appearance of spurious oscillations, is to obtain a discrete estimate of a singular functional associated to infected individuals. Finally, in the course of some numerical simulations, the new scheme performs better than other more classical finite element schemes.

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References

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