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Analytical properties of an age-group SIR model and their numerical preservation: application to social networks

In this communication, we aim to analyze an age-group SIR (Susceptible-Infected-Recovered) model [2, 3, 6]. Theoretical results concerning the positivity of the analytical solution, the conservation of the total population, and the stability of the equilibrium points are given. Since the model is a nonlinear system of ordinary differential equations, a numerical approximation is considered, based on Standard and non Standard Finite Difference methods [4, 7], and on the Modified Patankar Euler method [1]. Moreover, the numerical preservation of the qualitative properties of the model through the proposed step by step schemes is studied. The above results are applied to the diffusion of information in social networks [3, 5] and several numerical experiments on real data are shown in order to prove the effectiveness of the different approaches.

References

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