

Discrete reaction-diffusion equation: an application

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The contribution deals with a discrete counterpart of the reaction-diffusion PDE, that is, with the system

$$\begin{aligned}u_i(t+1) &= r_i u_i(t) + \rho_i v_i(t) + \sum_{j=1}^k c_{ij} (r_j u_j(t) + \rho_j v_j(t) - r_i u_i(t) - \rho_i v_i(t)), \\v_i(t+1) &= \sigma_i u_i(t) + s_i v_i(t) + \sum_{j=1}^k d_{ij} (\sigma_j u_j(t) + s_j v_j(t) - \sigma_i u_i(t) - s_i v_i(t)).\end{aligned}$$

The existence and stability of the “spatially homogeneous” solution is examined and an occurrence of a Turing instability is discussed.

The system can be considered as a model of a “spread of interacting ideas”. Hence, it finds an application in the generative historiography (or cliodynamics) and it may enrich a non-complete archaeological or textual record with a complementary insight.

[1] Collar A., *Religious Networks in the Roman Empire. The spread of new ideas.* Cambridge Univ. Press (2013)