

# An integro-differential system modelling the spread of epidemics on networks

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We consider a nonlinear SIS-type integro-differential system which is the continuous version of a discrete model for the propagation of epidemics on networks. Under the assumption of limited transmission, we prove the global existence of a unique solution for any diffusion coefficients. We investigate the existence of an endemic equilibrium and prove its linear stability. In the case of equal diffusion coefficients, we reduce the system to a Fisher-type equation with nonlocal diffusion and investigate the large-time behaviour of the solution.

Under the assumption of nonlimited transmission, we also prove existence results and establish the existence of an endemic equilibrium under a threshold condition that improves the one obtained for the discrete model.