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*Delayed reaction diffusion models and traveling waves for spatial spread of rabies in Europe: a re-visit*

In this talk, spatial spread of rabies in Europe is re-visited with the consideration of the impacts of the incubation and its interaction with the spatial movement of the susceptible and the incubative. First, a delayed reaction diffusion model is constructed with the incorporation of the incubation only. The minimal spreading speed is derived by the classical stability analysis and it is shown to be a decreasing function of the incubation time. A new method based on the integration of wave pulses is proposed which yields the existence of wave patterns for all values of the incubation time. In addition, by incorporating the spatial movement of the incubative foxes, a non-local reaction diffusion system is constructed. Rigorous proof of the existence of the wave patterns is shown via the integration of the wave pulses coupled with the Fredholm alternative theorem.