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Modelling external noise in epidemics models of bacteriophage infection

In the last years, there has been an explosion of interest in stochastic modelling in many application areas, including population dynamics and epidemics models, mostly because it can provide an additional degree of realism to deterministic modelling. In this talk we provide examples of how “external” (or “environmental”) noise can arise in epidemics systems and in which way it can be used to validate the goodness of the original deterministic models. We consider different stochastic extensions of a generalised Campbell model of the epidemics induced by virulent phages on bacteria (M. Carletti, *Mean-square stability of a stochastic model for bacteriophage infection with time delays*, Math. Biosci., 2007). We consider white and coloured noise processes affecting the model parameters and investigate how the dynamical behaviour of the system changes. We also consider the issue of the robustness of the positive equilibria with respect to random fluctuations of the environment.

This is a joint work with **G. Zanghirati** from the Department of Mathematics, University of Ferrara (Italy), and **M. Carletti**, from the SUAN Department, University of Urbino “Carlo Bo” (Italy).