ON THE TIME TO REACH A CRITICAL NUMBER OF INFECTIONS IN RECURRENT EPIDEMIC MODELS

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ABSTRACT

In this talk the interest is in the time T to reach a critical number K_0 of infections during an outbreak in an epidemic model with infective and susceptible immigrants. The underlying process $\mathcal{X}$, which was first introduced by Ridler-Rowe [1], is related to recurrent diseases and it appears to be analytically intractable. An approximating model (inspired from the use of extreme values) is presented, and formulae for the Laplace-Stieltjes transform of T and its moments are derived. Numerical examples are presented to illustrate the effects of the contact and removal rates on the expected values of T and the threshold K_0, when the initial time instant corresponds to an invasion time. We also study the exact reproduction number $R_{exact,0}$ and the population transmission number R_p, which are random versions of the basic reproduction number $\mathcal{R}_0$.
The talk is based on a joint work [2] with A. Gómez-Corral and M.T. Rodríguez-Bernal.

References

[1] Ridler-Rowe CJ (1967) *On a stochastic model of an epidemic*, Journal of Applied Probability, Volume **4**, pp. 19–33.

[2] Almaraz E, Gómez-Corral A and Rodríguez-Bernal MT (2015) *On the time to reach a critical number of infections in epidemic models with infective and susceptible immigrants* submitted.