

Disease regulated population in a SEIR model with delay

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We consider a SEIR-type disease transmission model with fixed latency period, standard incidence and variable population size. It is assumed that the fertility of infected individuals is decreased, and individuals recover from the disease and acquire permanent immunity with probability f , and dies from the disease with probability $1 - f$. Two threshold parameters are found which determine whether the disease dies out or remains endemic and whether the size of the population tends to zero, remains finite or grows exponentially. In addition, for the proportional form of the model, in the particular case when infected individuals are assumed to be unable to give birth, we give a complete classification of the equilibria by a novel application of the envelope method.

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