

Derrick, W. R.; van den Driessche, P.

A disease transmission model in a nonconstant population. (English) Zbl 0772.92015
J. Math. Biol. 31, No. 5, 495-512 (1993).

Summary: A general SIRS disease transmission model is formulated under assumptions that the size of the population varies, the incidence rate is nonlinear, and the recovered (removed) class may also be directly reinfected. For a class of incidence functions it is shown that the model has no periodic solutions. By contrast, for a particular incidence function, a combination of analytical and numerical techniques are used to show that (for some parameters) periodic solutions can arise through homoclinic loops or saddle connections and disappear through Hopf bifurcations.

MSC:

[92D30](#) Epidemiology
[34C25](#) Periodic solutions to ordinary differential equations

Cited in **58** Documents

Keywords:

nonlinear incidence function; varying population size; general SIRS disease transmission model; homoclinic loops; saddle connections; Hopf bifurcations

Software:

AUTO-86

Full Text: [DOI](#)