

SIR Model

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Abstract.

Resumo.

1. Introduction

A brief introduction ...

1.1. SIR Model

The first well-know mathematical model for modelling diseases was the SIR model, which was first used by Kermack and McKendrick in 1927 and has subsequently been applied to a variety of diseases, especially airborne childhood diseases with lifelong immunity upon recovery, such as measles, mumps, rubella, and pertussis.

The model is given by a set of ordinary differential equations (ODE's) and can supply two types of behaviours, with and without vital dynamics.

$$\begin{cases} \frac{dS}{dt} = \mu N - \frac{\beta SI}{N} - \eta S \\ \frac{dI}{dt} = \frac{\beta SI}{N} - \gamma I - \eta I \\ \frac{dR}{dt} = \gamma I - \eta R, \end{cases} \quad (1)$$

where $N = S + I + R = 1$ is the total population.

- S = Percentage of susceptible
- I = Percentage of infectious
- R = Percentage of recovered
- β = Infection rate
- γ = Recovery rate
- μ = Birth rate
- η = Death rate

References