Introduction

We consider the population count N to be constant.

First model : SI

The first model is quite simple : each infected people has a chance to infect new people. The infection rate is given by the parameter $\beta \in \mathbb{R}_+$. The evolution of infected people is thus given by the following recurrent equation :

$$I_t = I_{t-1} + (\beta) I_{t-1} \tag{1}$$

The figure TODO gives the results for a one year simulation with $\beta = 0.02$ and $I_0 = 3$. Notice, that the graph do not correspond exactly to the equation : it is truncated over $N = 100$. Indeed, in this problem, and with $\beta > 0$, we have $I_t \underset{t \to \infty}{\longrightarrow} +\infty$

Second model : SI corrected

$$I_t = I_{t-1} + \left(\frac{\beta}{N}\right) I_{t-1} S_{t_1} \tag{2}$$

Third model : SIS

$$I_t = I_{t-1} + \left(\frac{\beta}{N}\right) I_{t-1} S_{t-1} + \gamma I_{t-1} \tag{3}$$