

## MA 573 — PROJECT 6

**Due: Friday, December 4**

(1) Consider the SIR epidemic model

$$\begin{aligned}\frac{dS}{dt} &= -\beta IS \\ \frac{dI}{dt} &= \beta IS - \nu I \\ \frac{dR}{dt} &= \nu I\end{aligned}$$

where  $\beta$  and  $\nu$  denote contact and recovery rates.

(a) Simulate the spread of the epidemic using the initial conditions  $S(0) = 5, I(0) = 0.01$  and  $R(0) = 0$ . When does it end?

(b) Now modify your model to include vaccination of newborns that provides life-time immunity. Simulate your results using the same initial conditions. Does your vaccination program work?