**17 Stochastic models of outbreaks**

**Overview**

**PART I: DTMC model**

Plot sample paths and (quasistationary) probability distribution in the following cases:

1. DTMC SIS model
2. DTMC SIS model
3. DTMC SIR model
4. DTMC SIR model

**PART II: CTMC model**

Plot sample paths and (quasistationary) probability distribution:

1. CTMC SIS model
2. CTMC SIS model
3. CTMC SIR model .
4. CTMC SIR model
5. Plot the graph of the probability of an outbreak as a function of time for different initial infectives . Use the same values for other parameters as in Q4. Compare the results with the formula.
6. Repeat the Q5 for different values of by varying the values of .
7. Run the CTMC SIR model with to plot the graph of final size distribution for different values of .

**PART Ⅲ: SDE model**

Plot sample paths and (quasistationary) probability distribution in the following cases:

1. SDE SIS model
2. SDE SIS model
3. SDE SIR model