Exam title

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TFY4235 - Computational physics
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Abstract

Short abstract

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I

Introduction

PART
II

Code overview

PART III

Results and Discussion

1 Problem 2A: SIR model

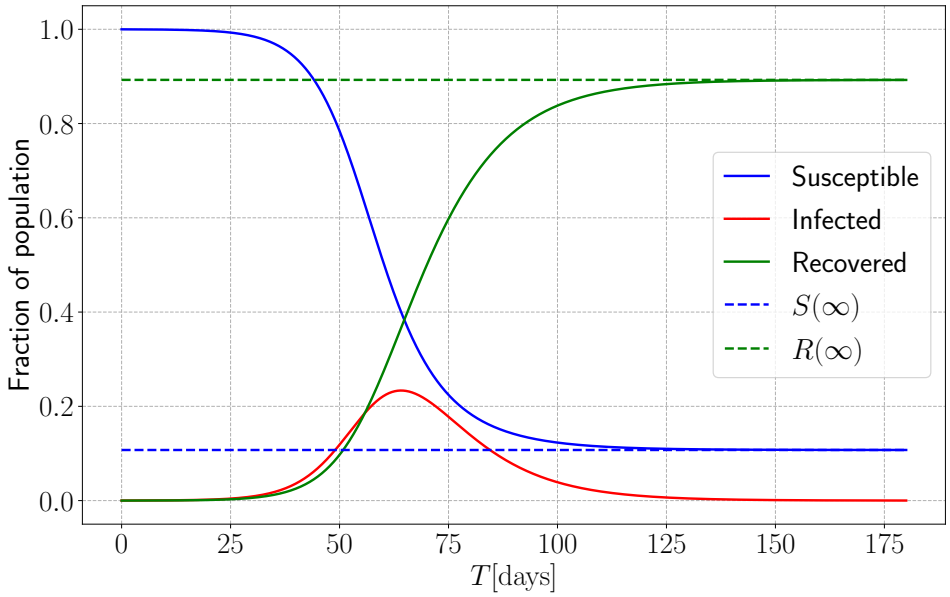

Figure 1: SIR equations with $\beta = 0.25\,\mathrm{day}^{-1}$, $\tau = 10\,\mathrm{day}$.

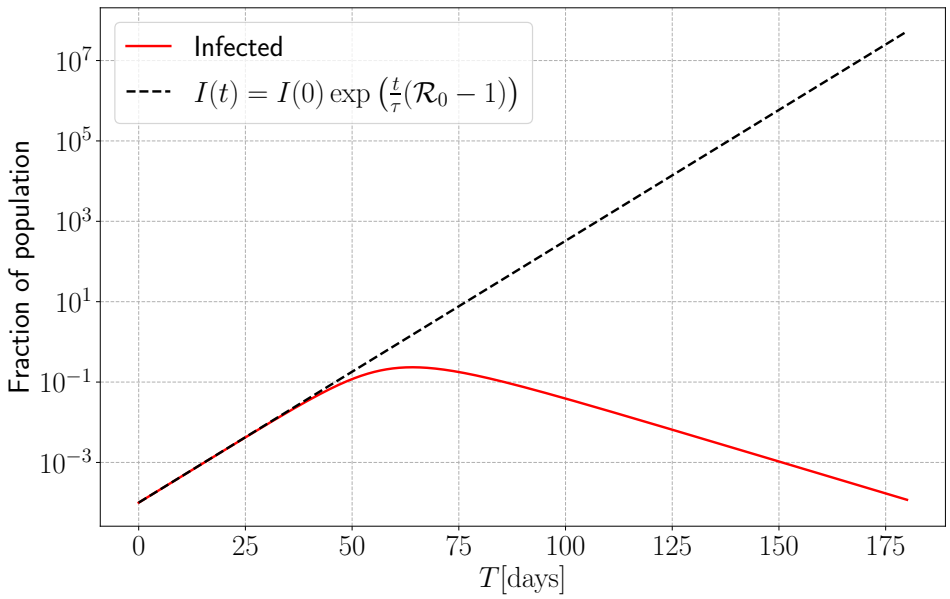

Figure 2: Infected people compared with the analytical approximation at the early stages.

2 Problem 2B: Stochastic SIR model

References

Table 1: The maximum value of β giving a peak less than 0.2 of the infected fraction, and the minimum value of $R(0)$ (vaccinated) avoiding exponential growth.

Parameter	value	$0.2 - \max_{t\in[0,\infty]} R(t)$	Initial log-slope
β	0.28020370	$8.319 \cdot 10^{-7}$	—
$R(0)$	0.59987499	—	$-1.74 \cdot 10^{-15}$

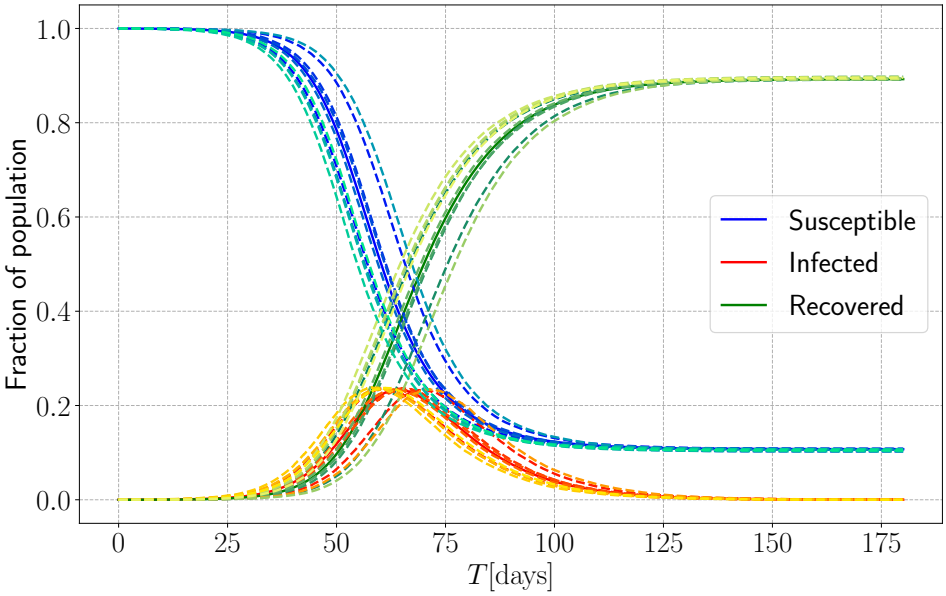

Figure 3: Solution of stochastic SIR equations with $\beta = 0.25\,\mathrm{day}^{-1}$, $\tau = 10\,\mathrm{day}$.

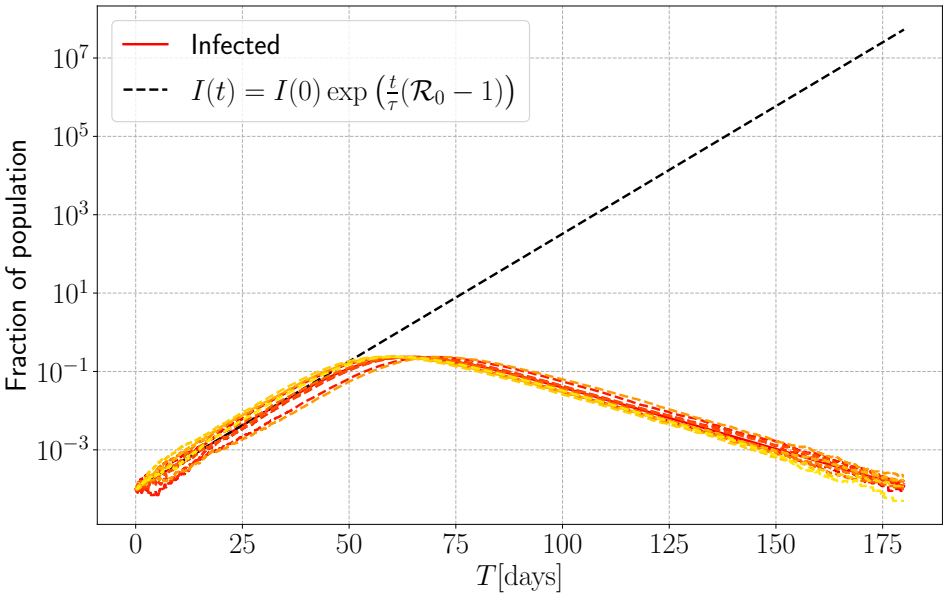

Figure 4: Infected people compared with the analytical approximation at the early stages. Stochastic and continuous model.

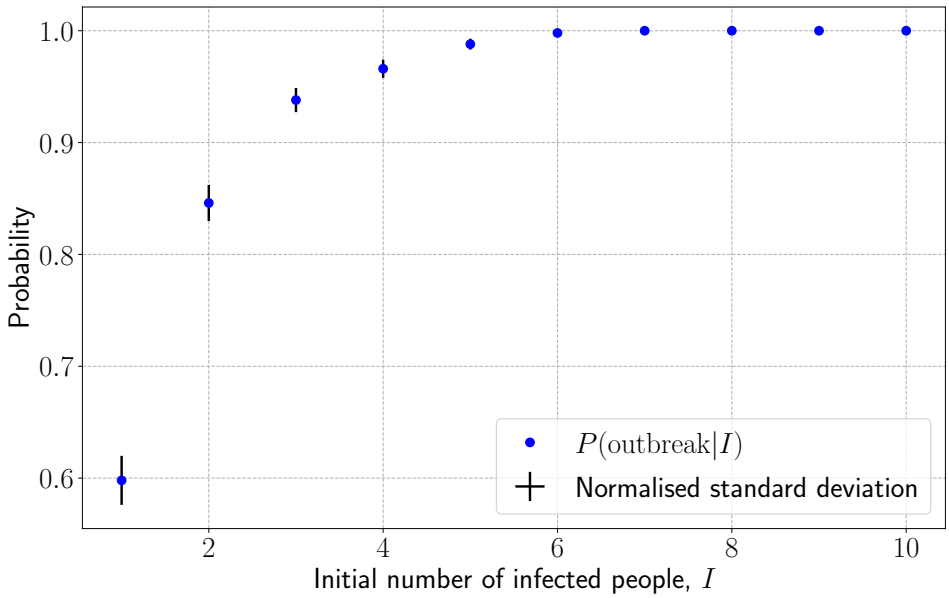

Figure 5: Probability of an outbreak as a function of initial number of infected people.

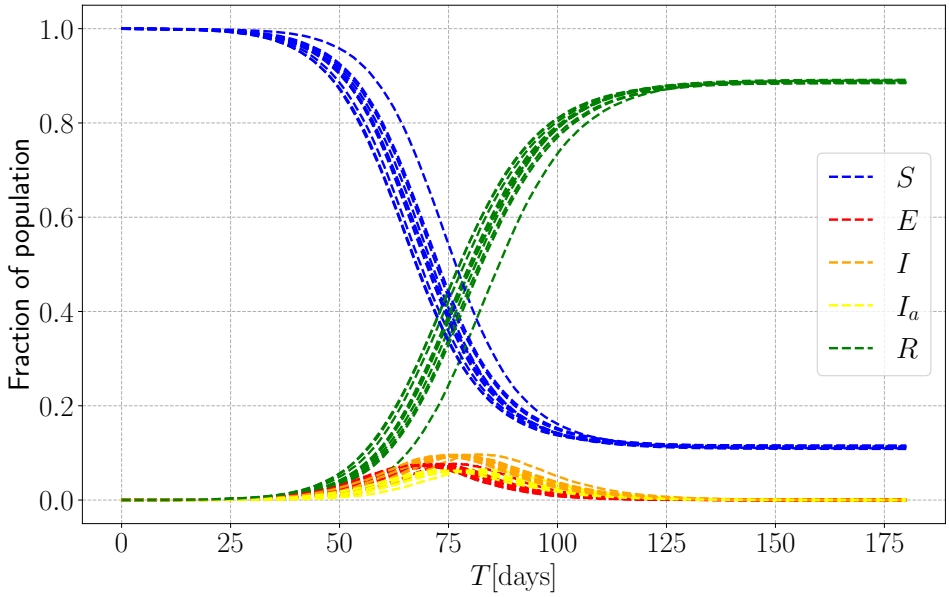

Figure 6: Solution of the stochastic SEIIaR-equations.

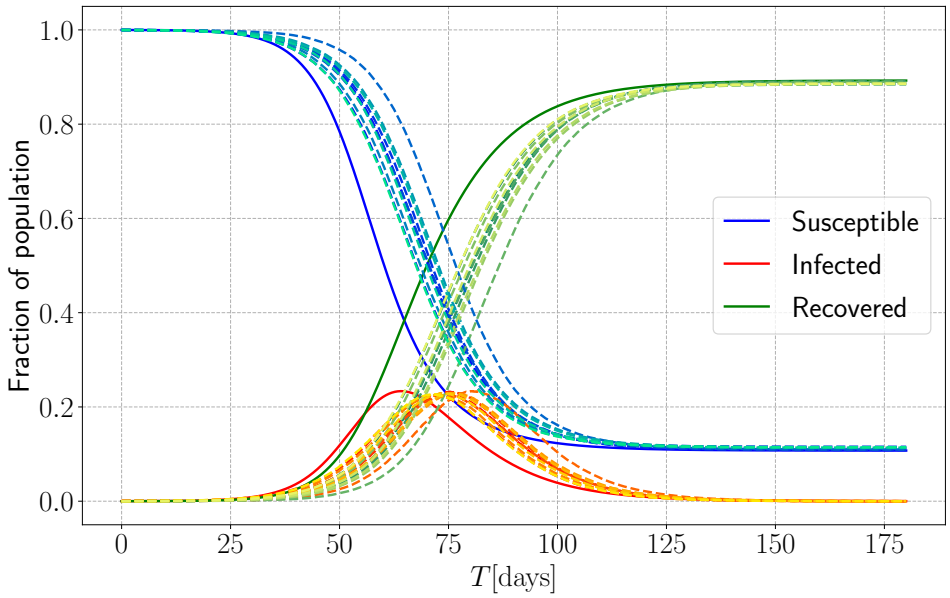

Figure 7: Comparison of the solution of the Stochastic SEIIaR-equations with the deterministic SIR-model. The number of infected people I in the stochastic model is $E+I+I_a$.

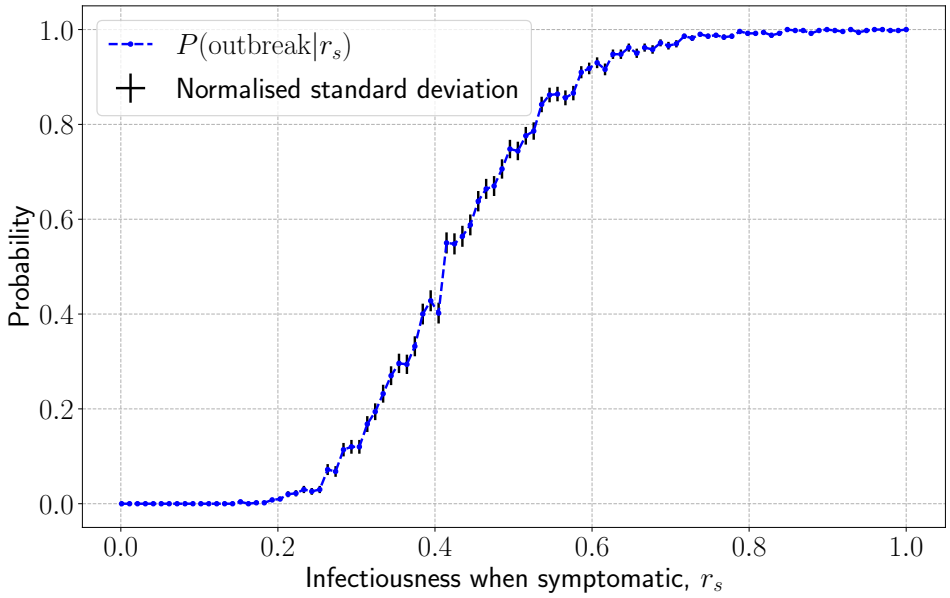

Figure 8: Probability of an outbreak as a function of r_s.