Project 5 in FYS3150

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Abstract

Stuff

1 INTRODUCTION

2 METHOD

2.a The SIRS method

2.b RungeKutta

To solve equation (sett inn her) we will first be using the 4th. order Runge Kutta method. This is a pretty standar method for solving differntial equations. One cycle of the method is

$$k_1 = f(t_n, y_n) \tag{1}$$

$$k_2 = f(t_n + \frac{\Delta t}{2}, y_n + \frac{\Delta t}{2} k_1) \tag{2}$$

$$k_3 = f(t_n + \frac{\Delta t}{2}, y_n + \frac{\Delta t}{2} k_2) \tag{3}$$

$$k_4 = f(t_n + \Delta t, y_n + \Delta t k_3) \tag{4}$$

$$y_{n+1} = y_n + \frac{\Delta t}{6} \left(k_1 + 2k_2 + 2k_3 + k_4 \right), \tag{5}$$

where y_n is the current step, y_{n+1} is the next step, t_n is the current time, Δt is the timestep, and f is the differntial equation.

2.c Monte Carlo

2.d Vital dynamics

2.e Seasonal Variation

2.f Vaccination

3 RESULTS

3.a The SIRS method

3.b RungeKutta

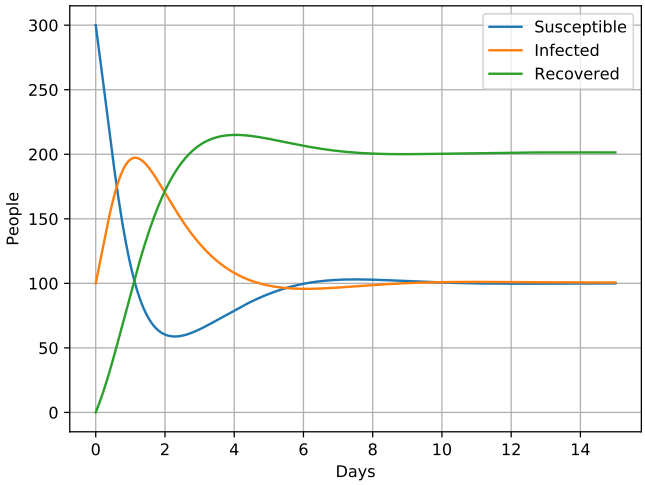


Figure 1: figure caption goes here

Group	Expected	Analytical	Number
$s*$	0.25	0.2499	100.0
$i*$	0.25	0.2516	100.6
$r*$	0.5	0.5035	201.4

Table 1: table caption goes here

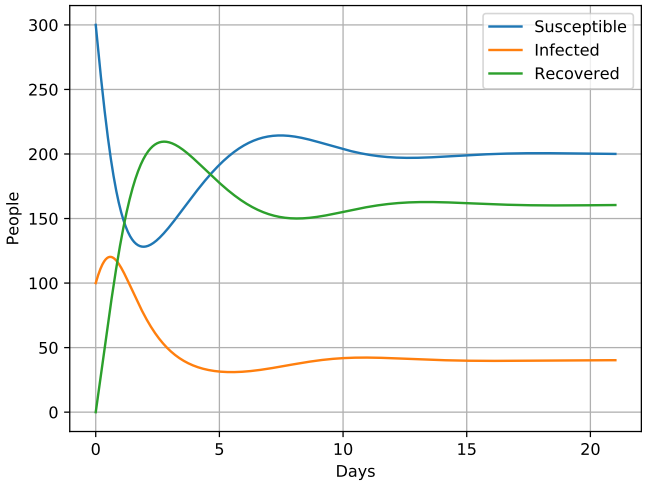


Figure 2: figure caption goes here

Group	Expected	Analytical	Number
$s*$	0.5	0.5001	200.1
$i*$	0.1	0.1006	40.2
$r*$	0.4	0.4011	160.5

Table 2: table caption goes here

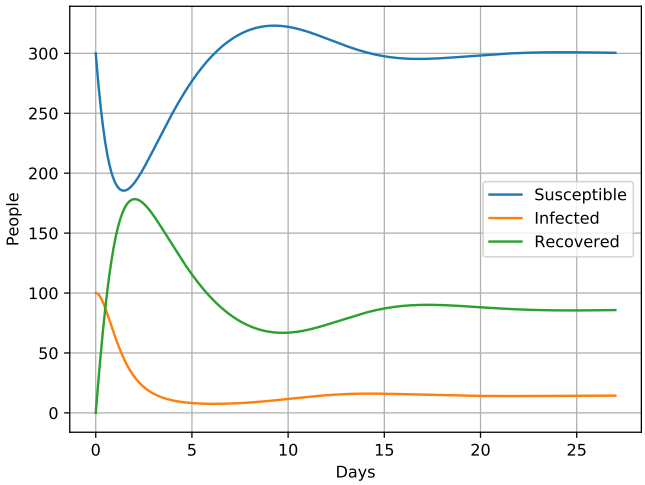


Figure 3: figure caption goes here

Group	Expected	Analytical	Number
$s*$	0.75	0.7511	300.5
$i*$	0.0357	0.0360	14.4
$r*$	0.2143	0.2145	85.8

Table 3: table caption goes here

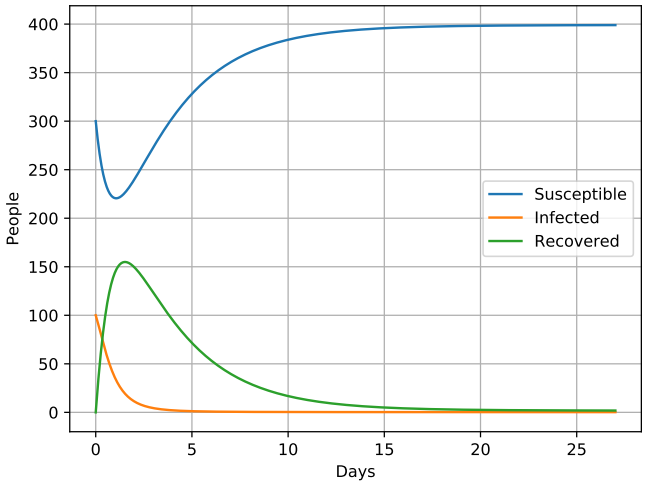


Figure 4: figure caption goes here

Group	Expected	Analytical	Number
$s*$	1.0	0.9974	399.0
$i*$	0.0	0.0006	0.2
$r*$	0.0	0.0047	1.9

Table 4: table caption goes here

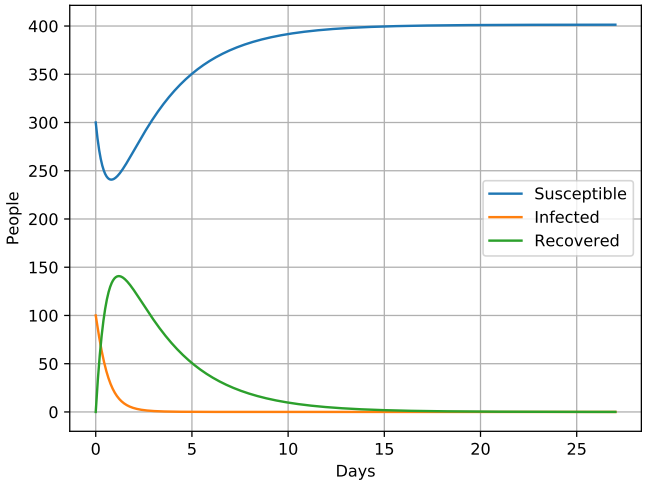


Figure 5: figure caption goes here

Group	Expected	Analytical	Number
$s*$	1.25	1.0034	401.4
$i*$	-0.0227	$4.7119 \cdot 10^{-11}$	$1.9 \cdot 10^{-8}$
$r*$	-0.2273	$8.4064 \cdot 10^{-5}$	$3.4 \cdot 10^{-2}$

Table 5: table caption goes here

3.c Monte Carlo

3.d Vital dynamics

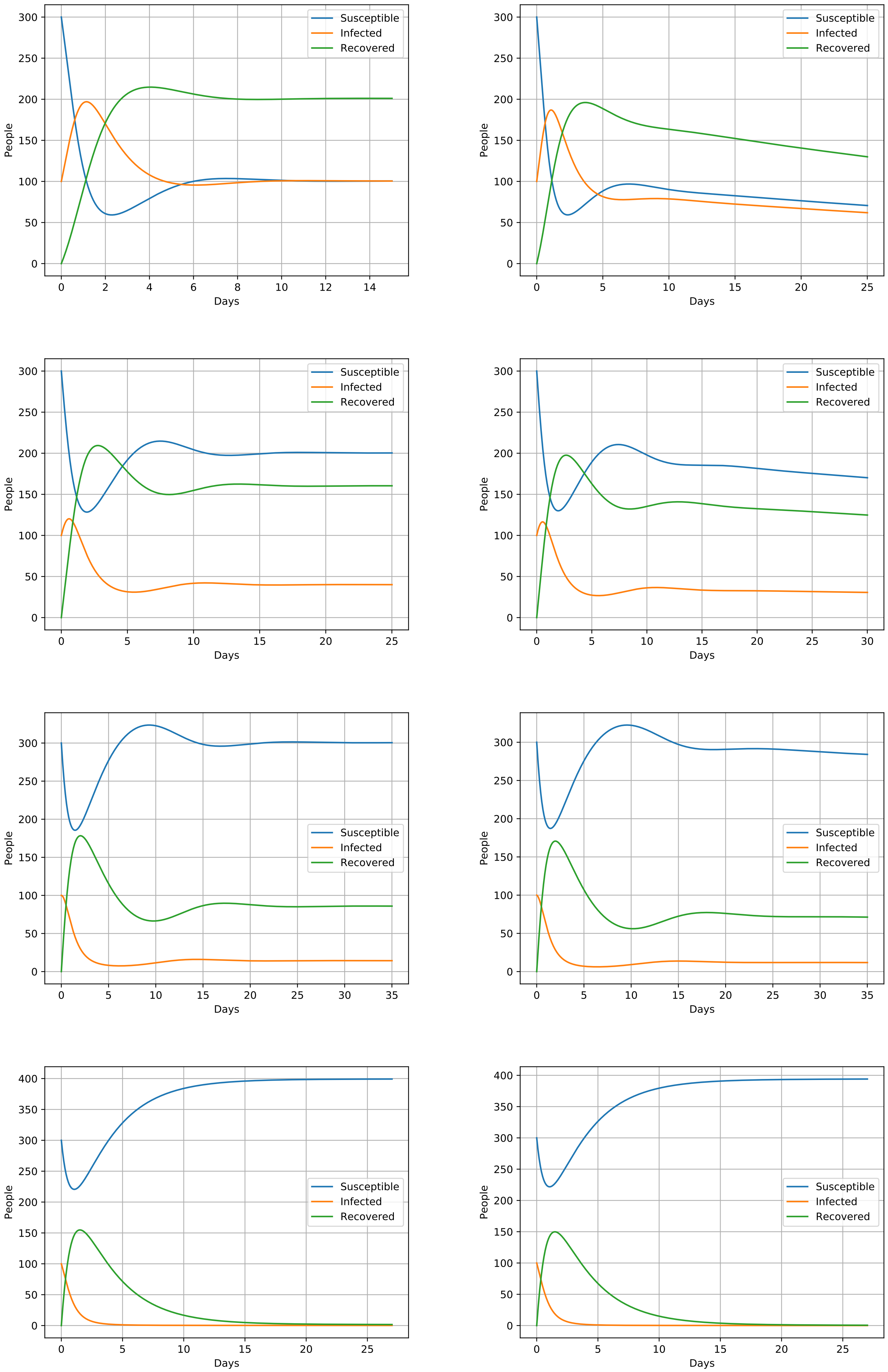
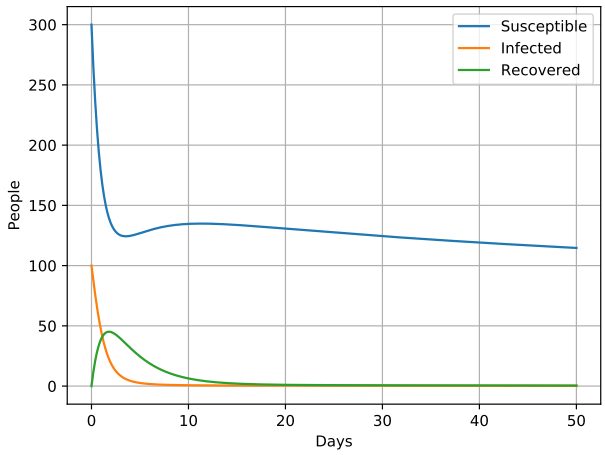
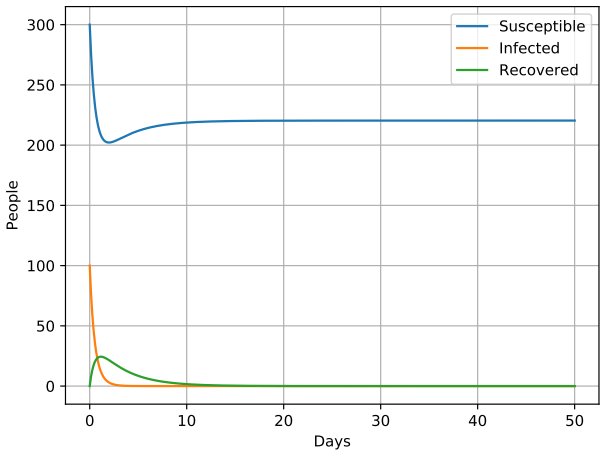
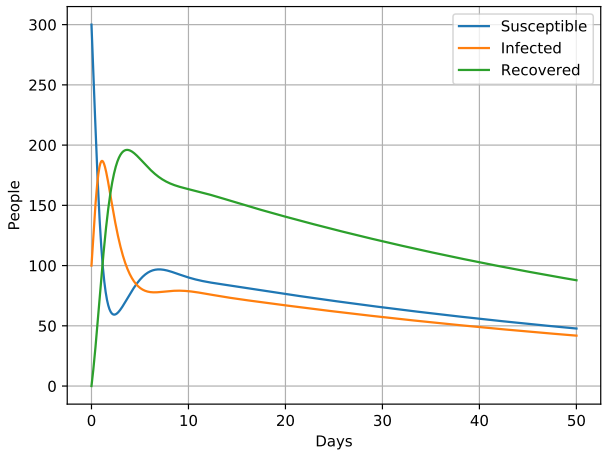
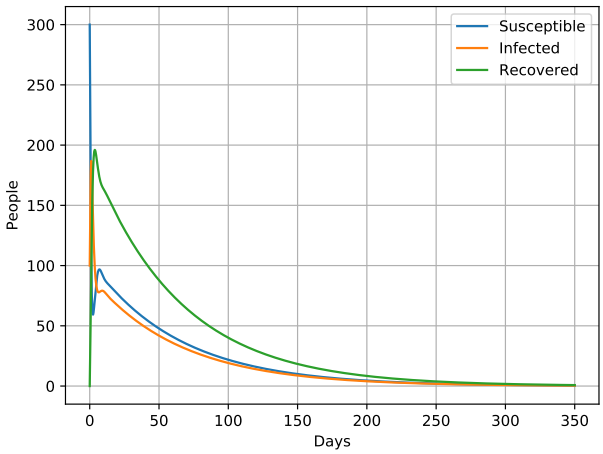


Figure 6: fyll inn









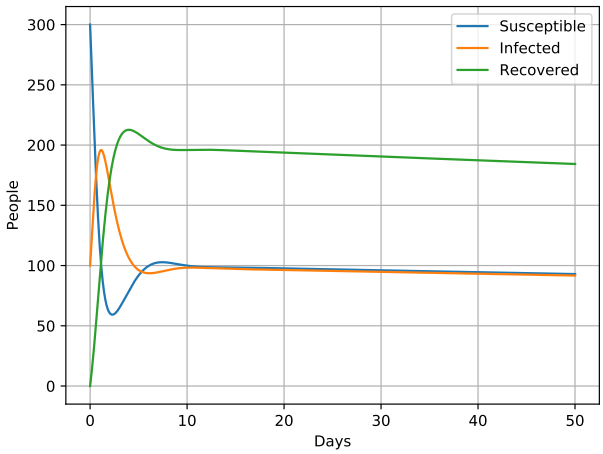


Figure 7: fyll inn

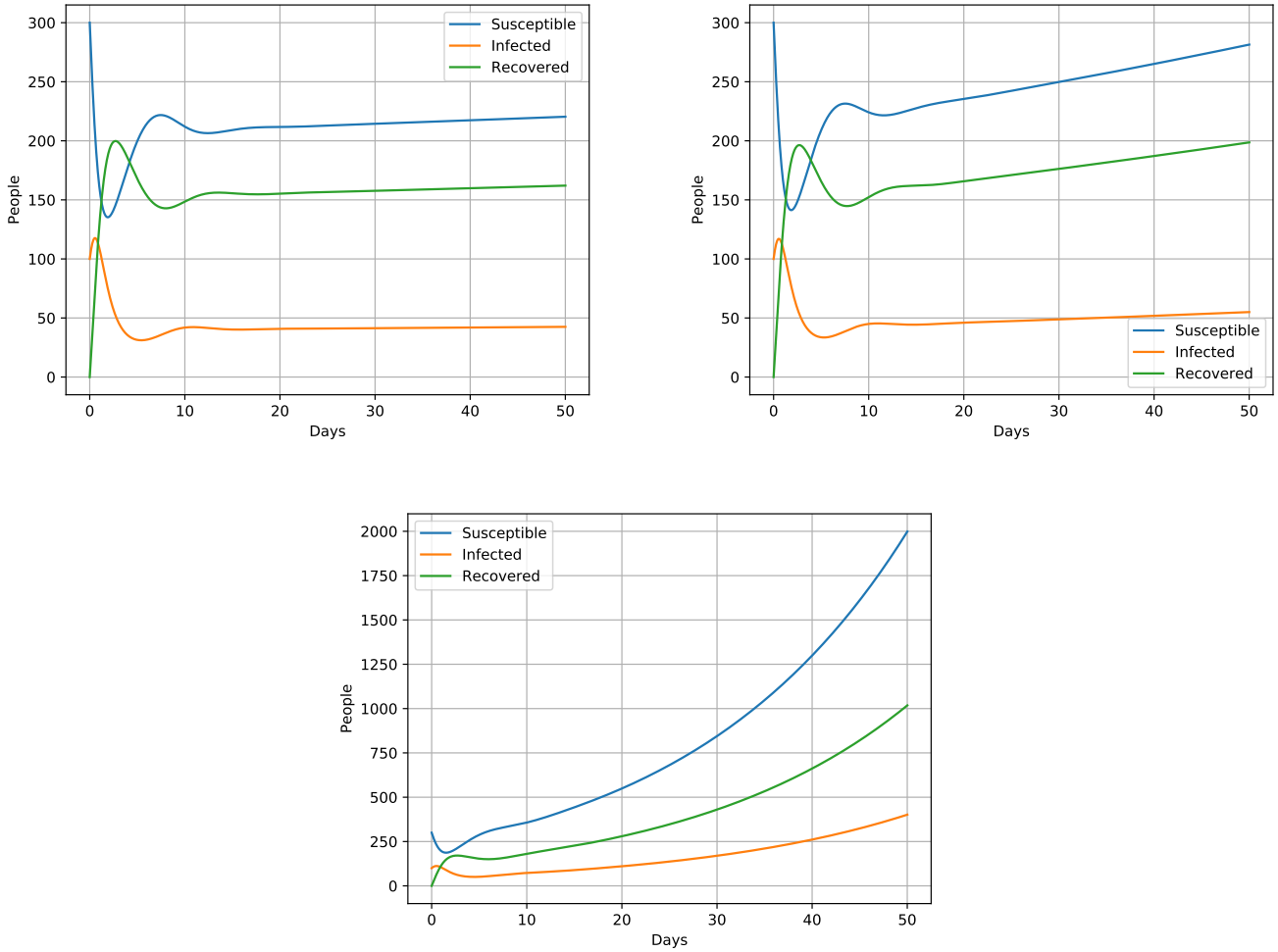


Figure 8: fyll inn

3.e Seasonal Variation

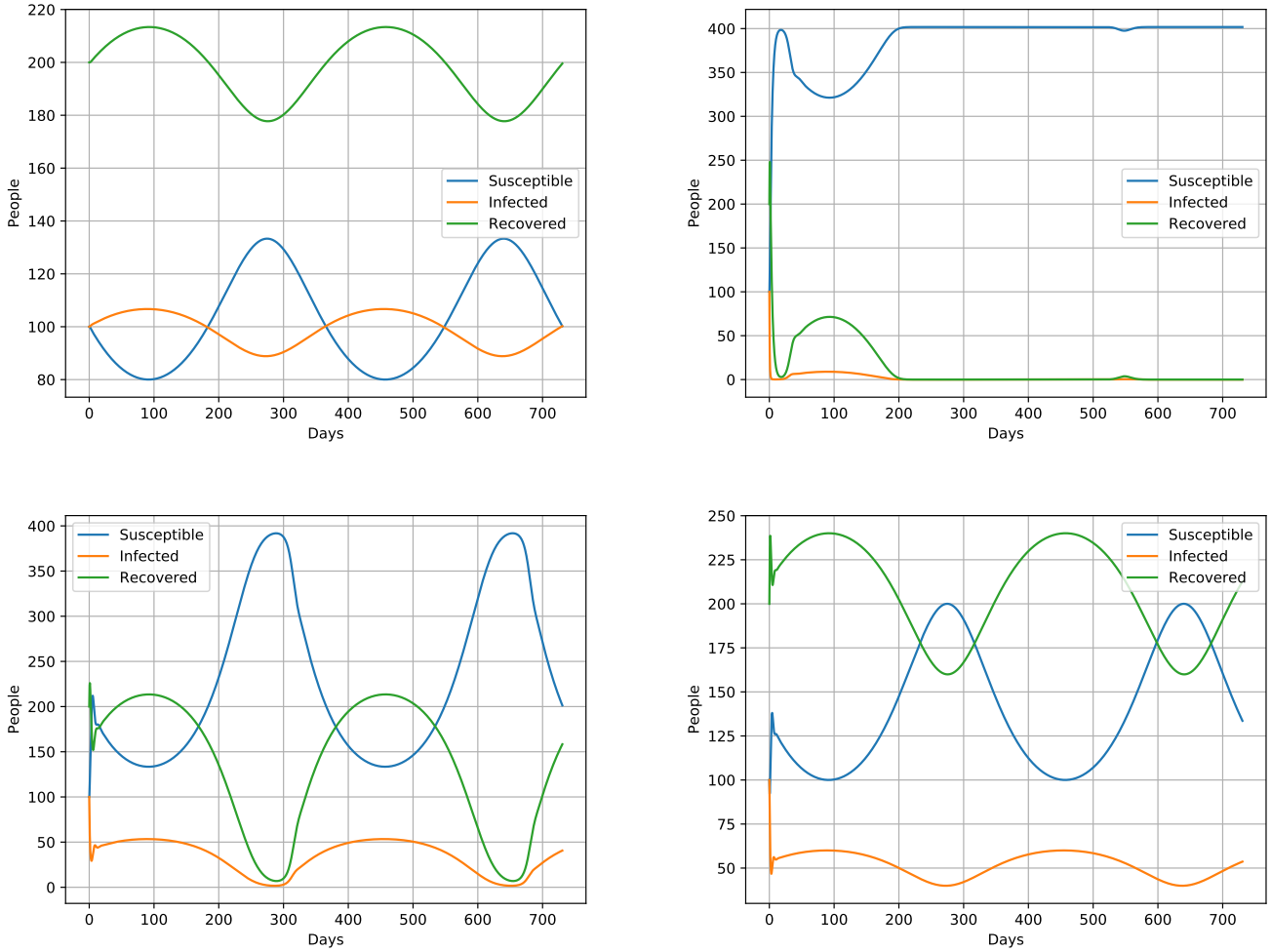


Figure 9: fyll inn

3.f Vaccination

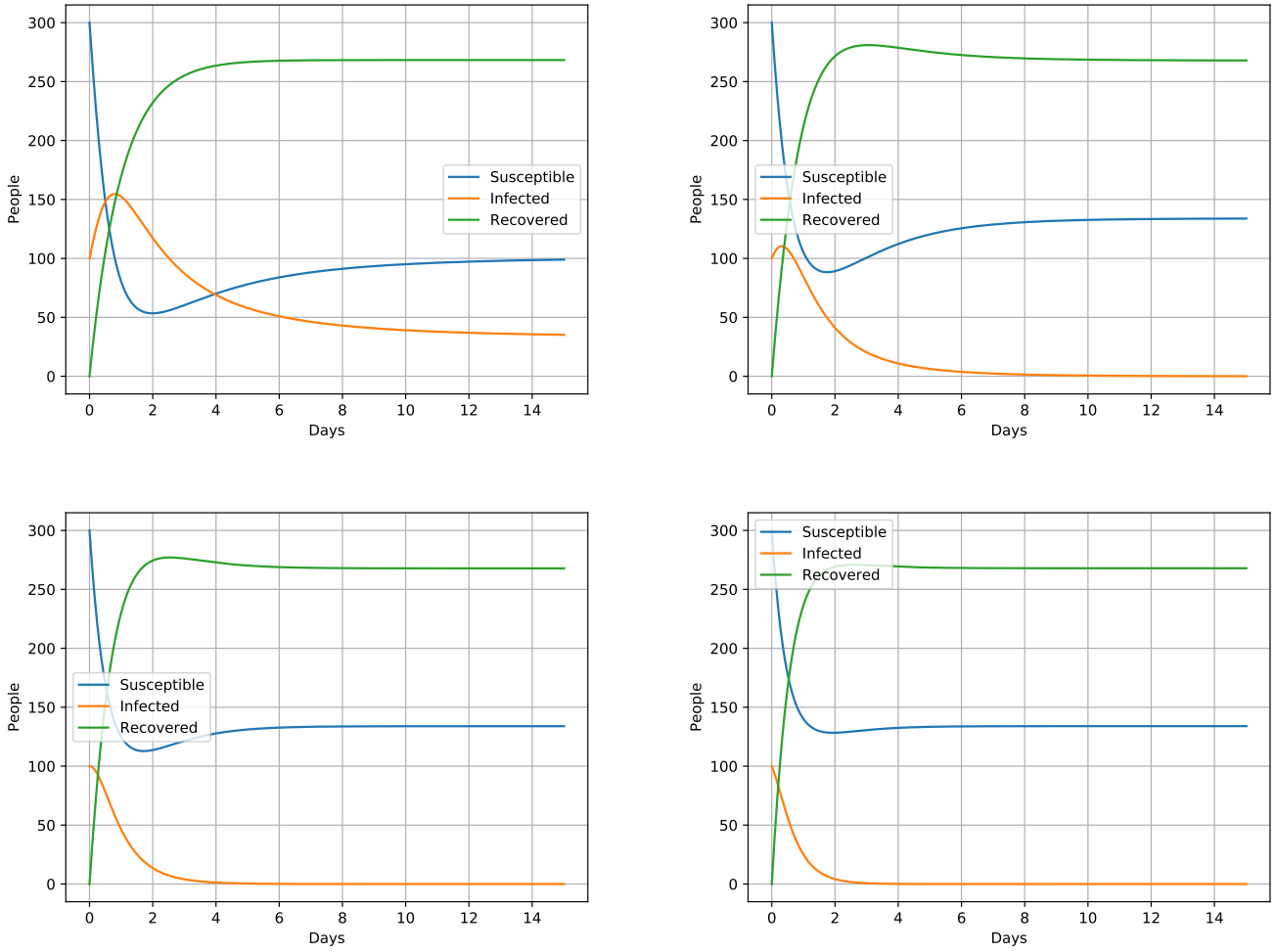


Figure 10: fyll inn

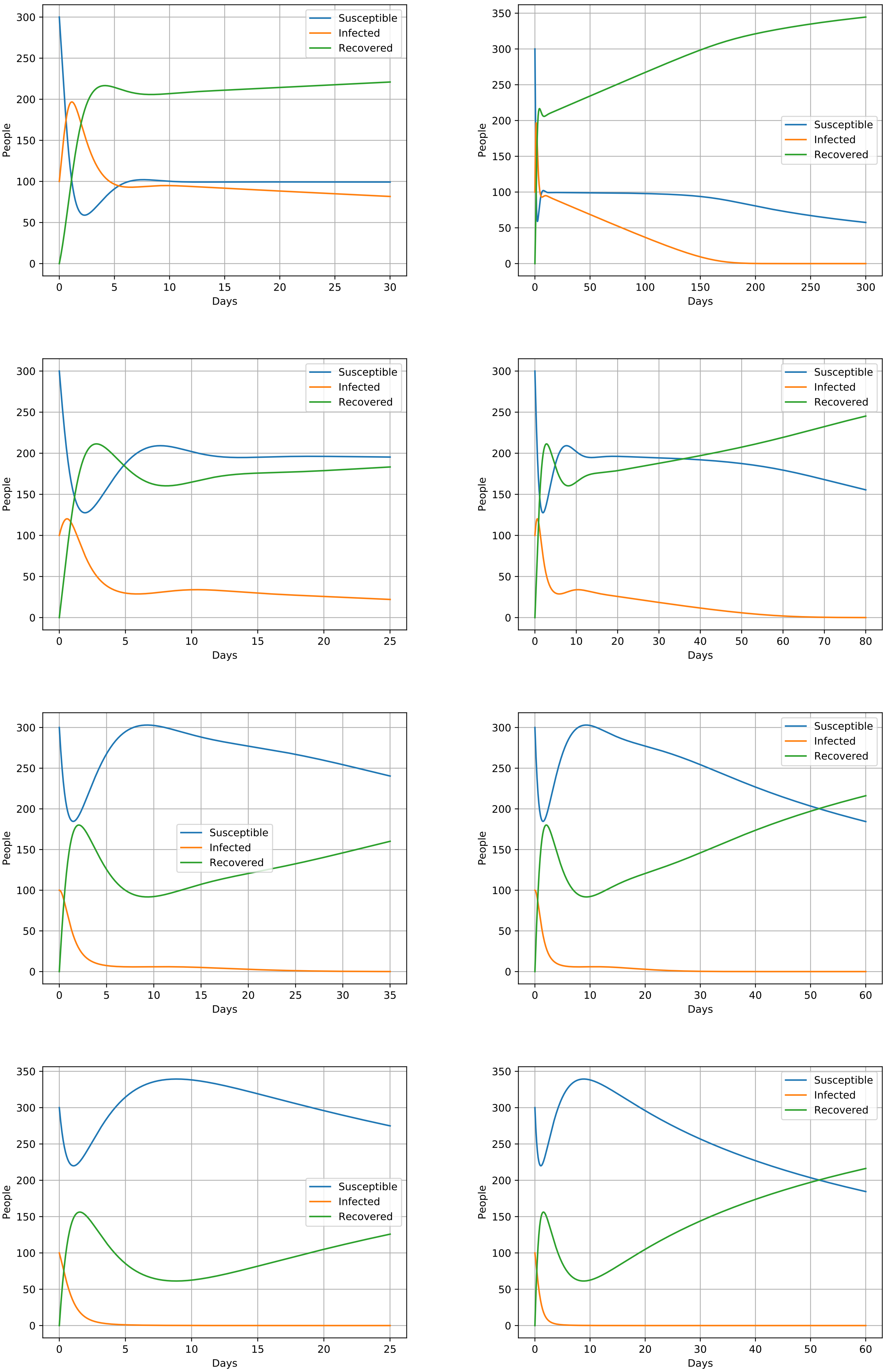


Figure 11: fyll inn

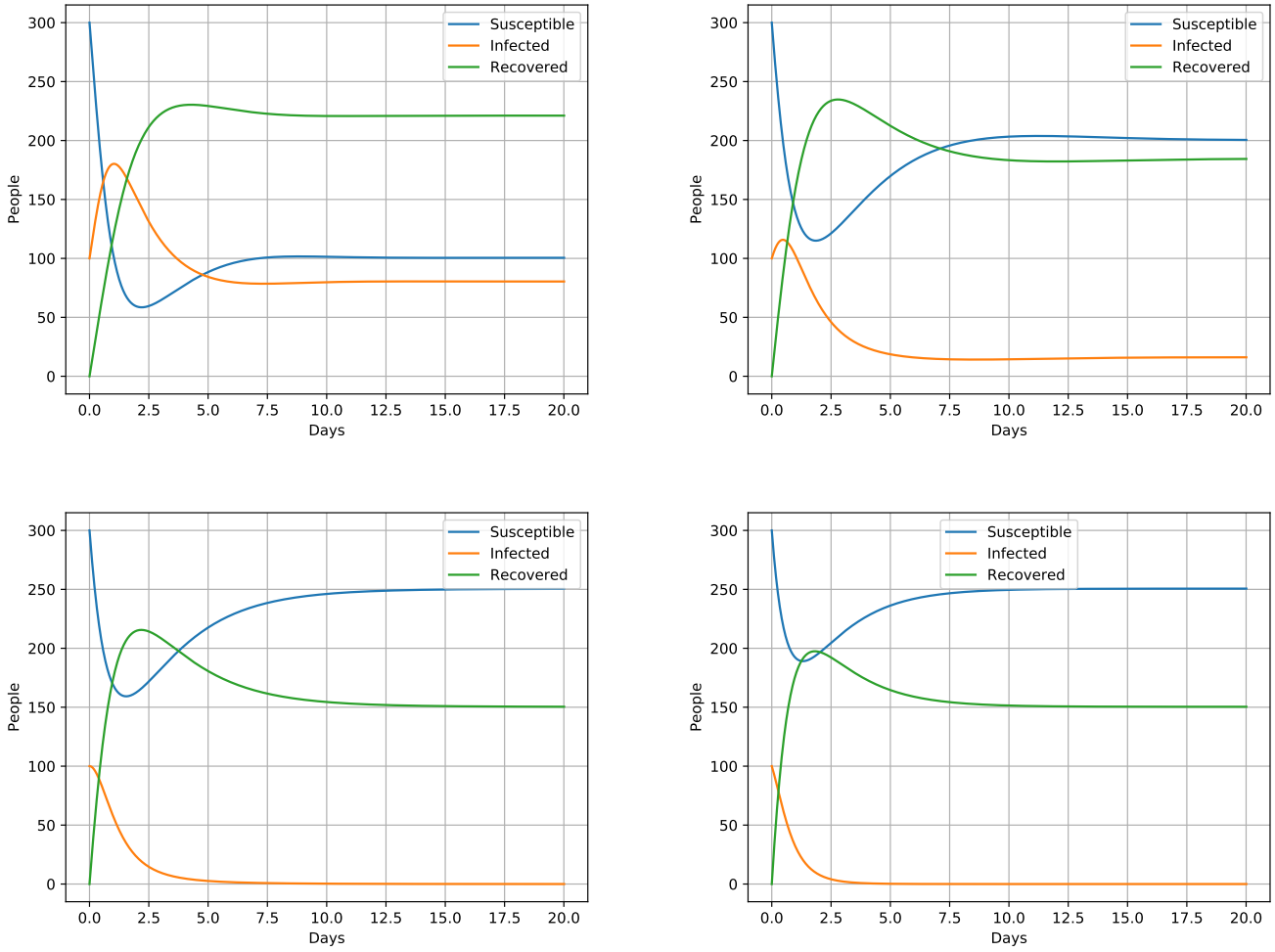


Figure 12: fyll inn

4 DISCUSSION

5 CONCLUTION

6 APPENDICES

All the calculations were done using the programing language Julia. The programs used can be found at: .

References

[1] Computational Physics, Lecture Notes Fall 2015, Morten Hjort-Jensen p. 419-424