HOMEWORK 3 - REPORT

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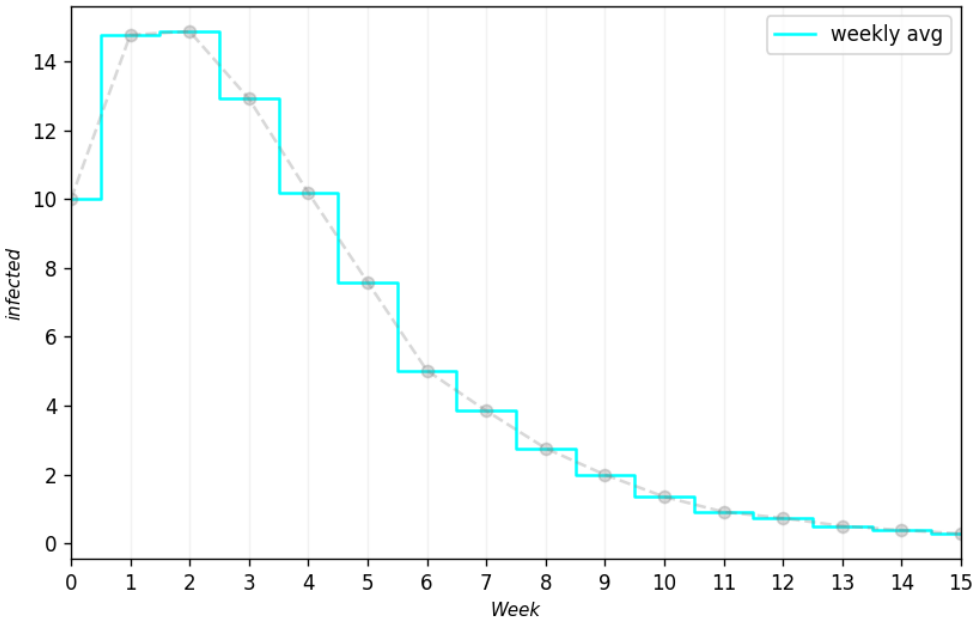
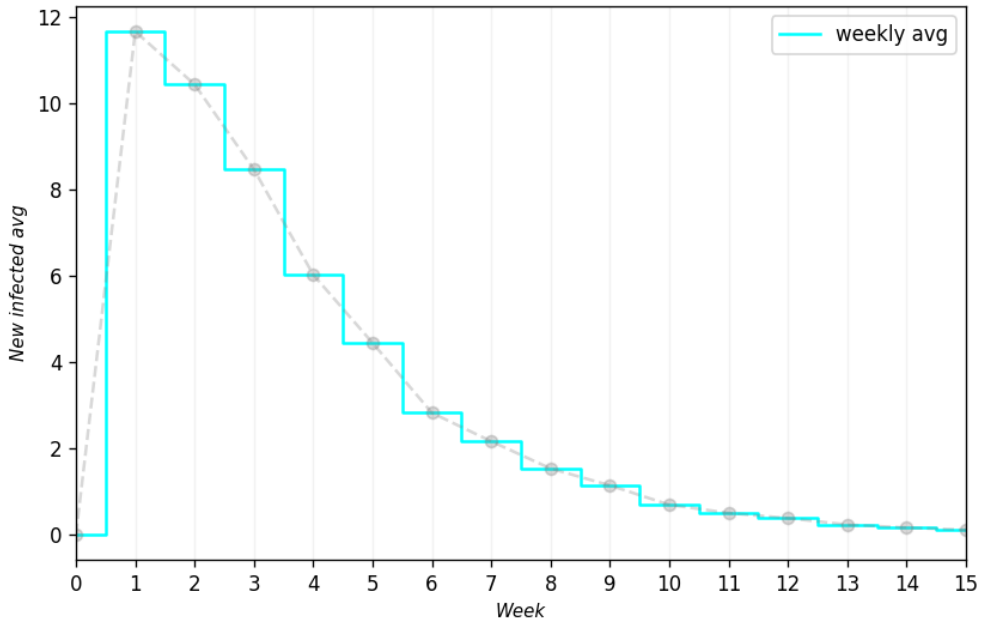
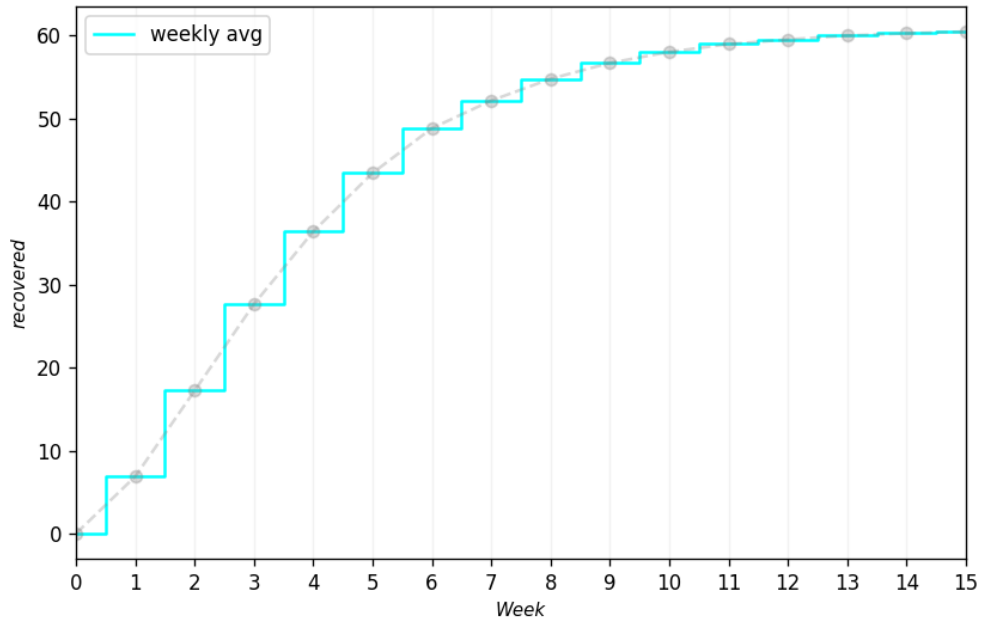
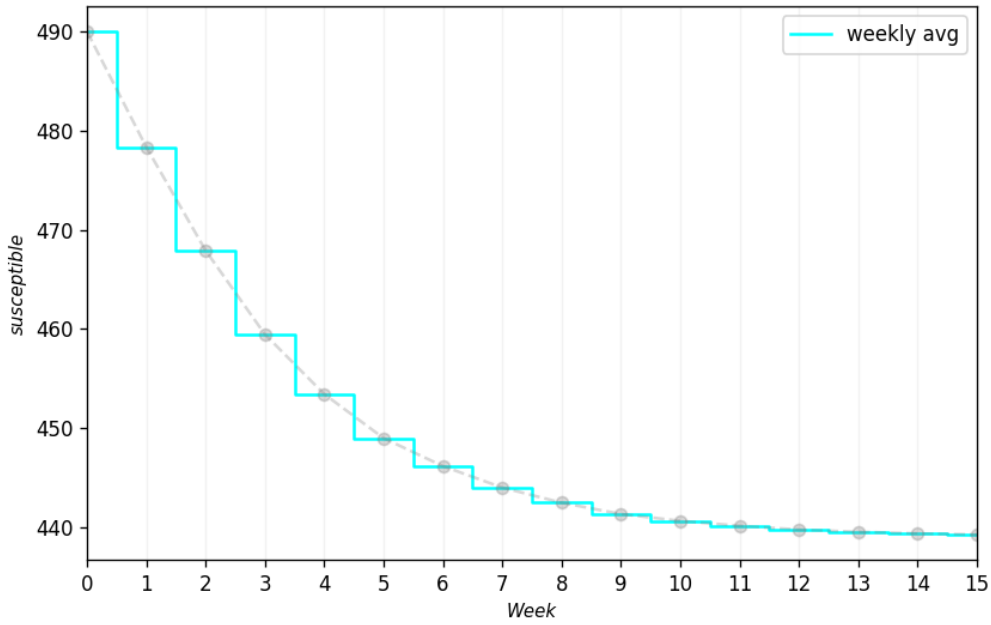
1 Influenza H1N1 2009 Pandemic in Sweden

1.1 Simulate epidemic on a k-regular graph

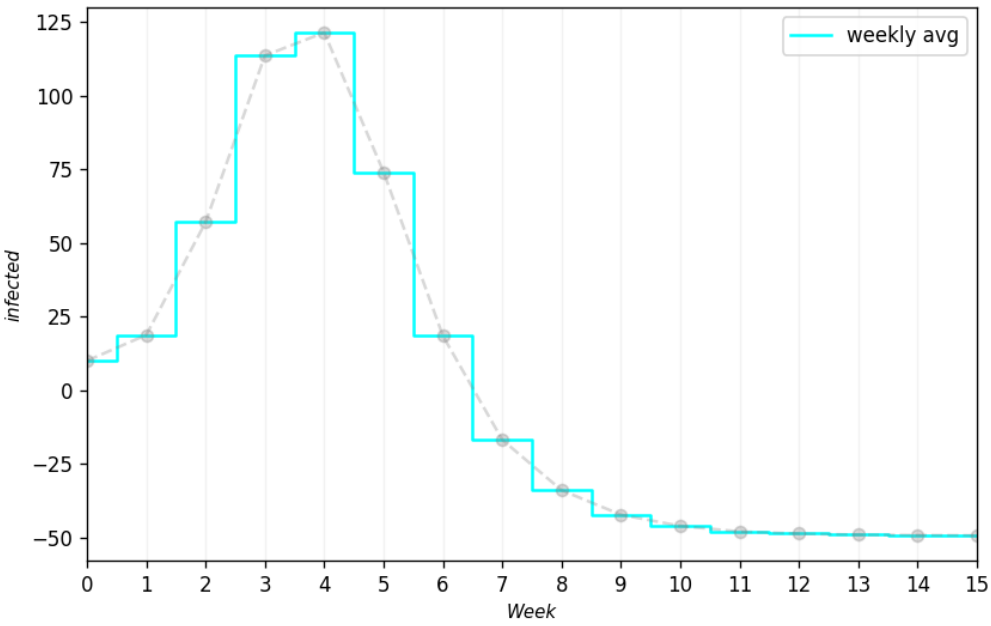


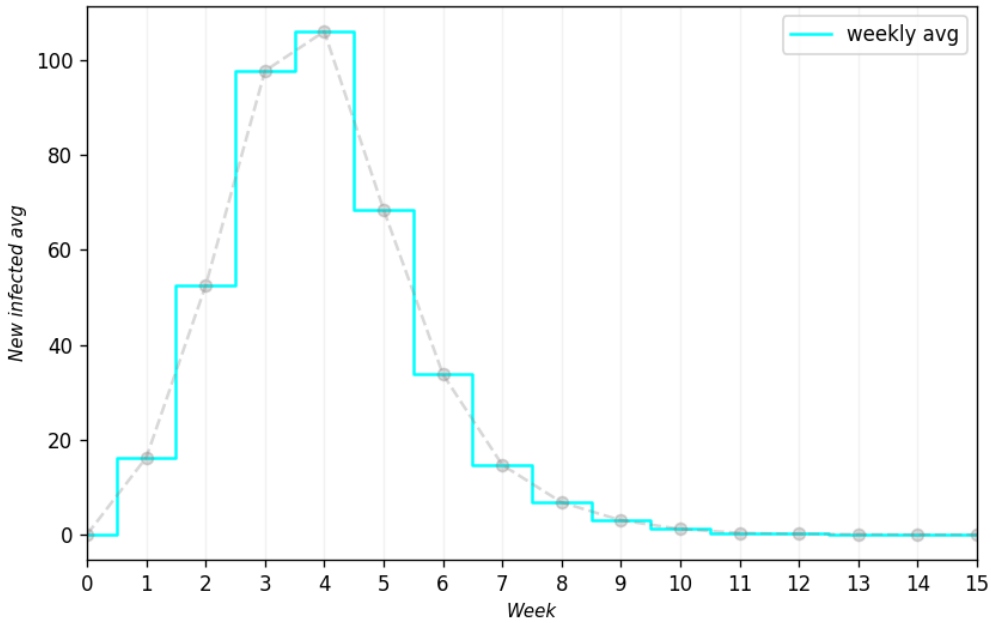

weekly avg
New infected avg
Week
0
2
4
6
8
10
12
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

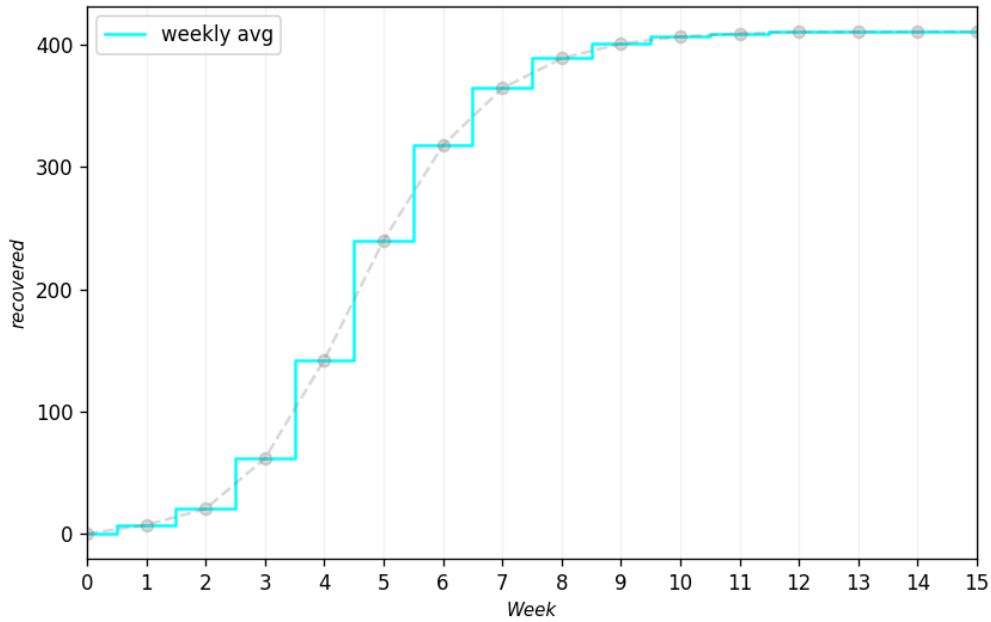

weekly avg
recovered
Week
0
10
20
30
40
50
60
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

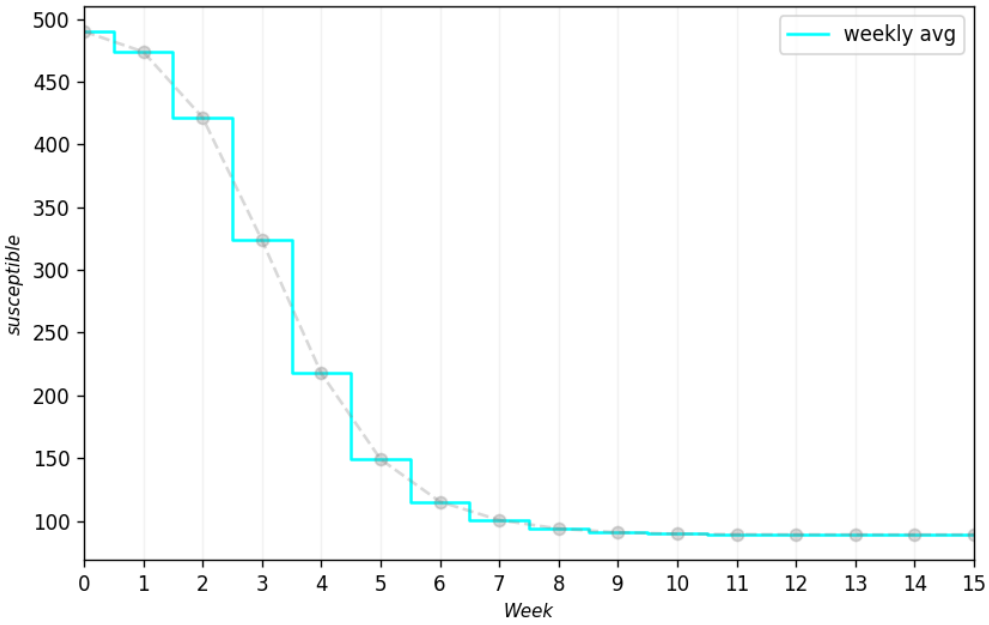


1.2 Simulate epidemic on random graph without vaccination

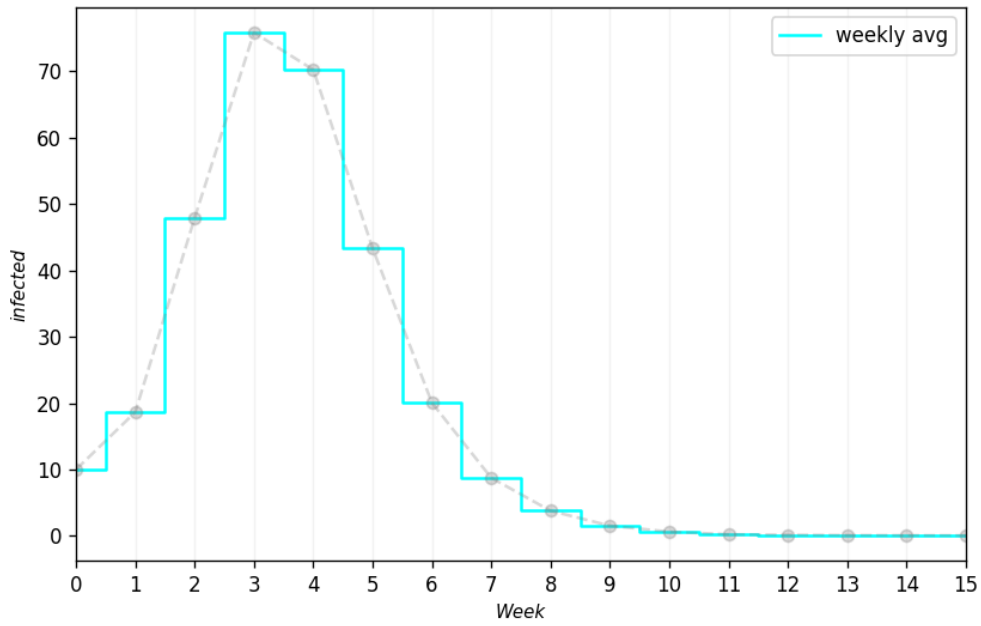


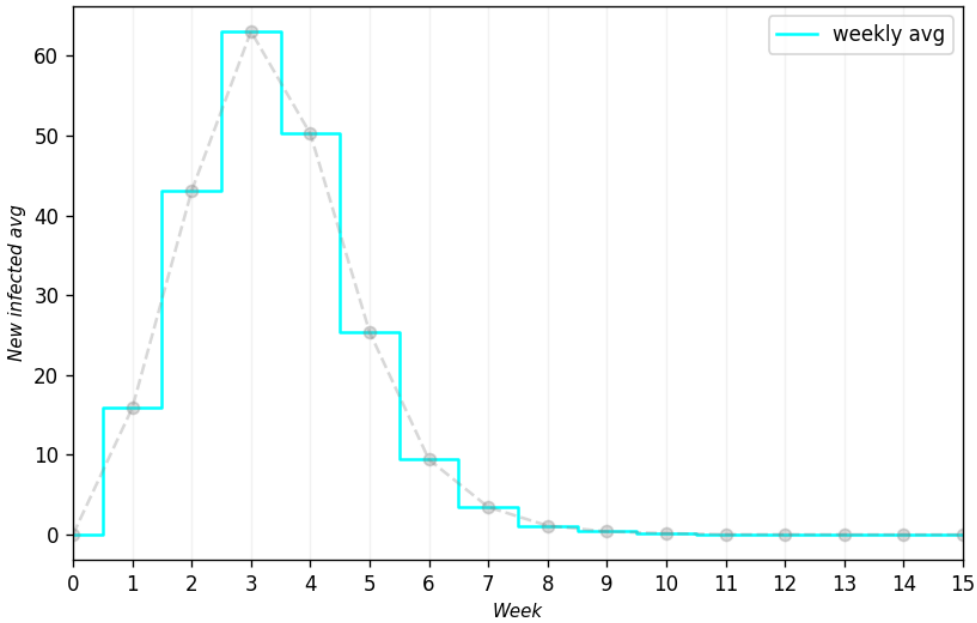

weekly avg
New infected avg
Week
0
20
40
60
80
100
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

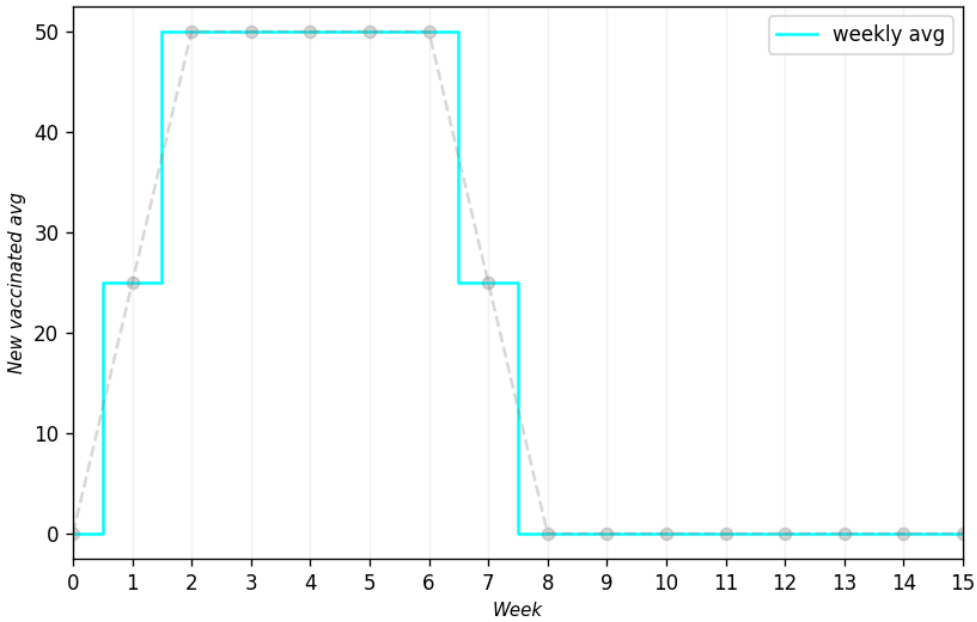

weekly avg
recovered
Week
0
100
200
300
400
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

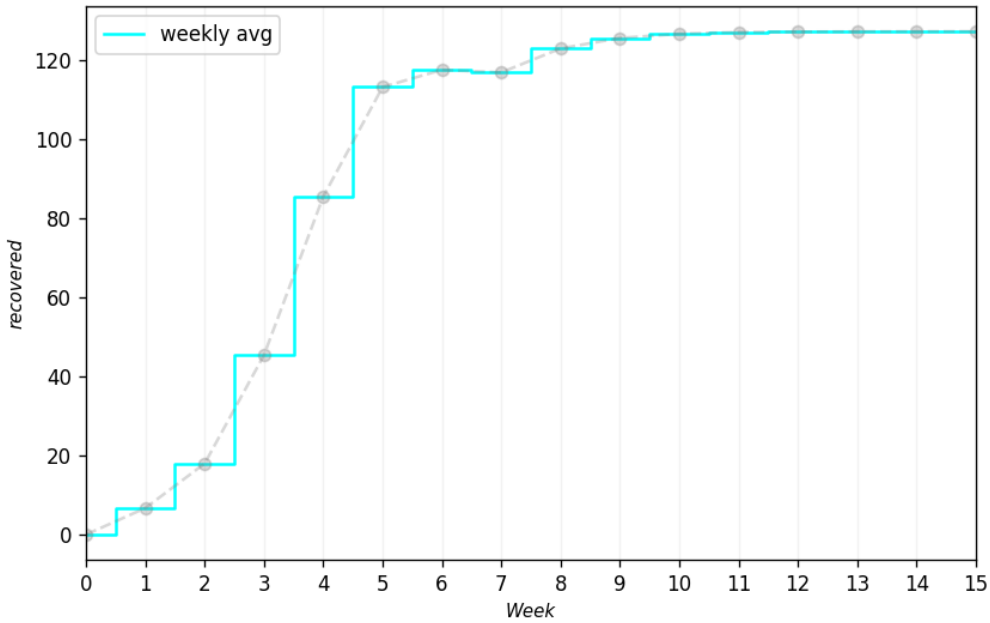


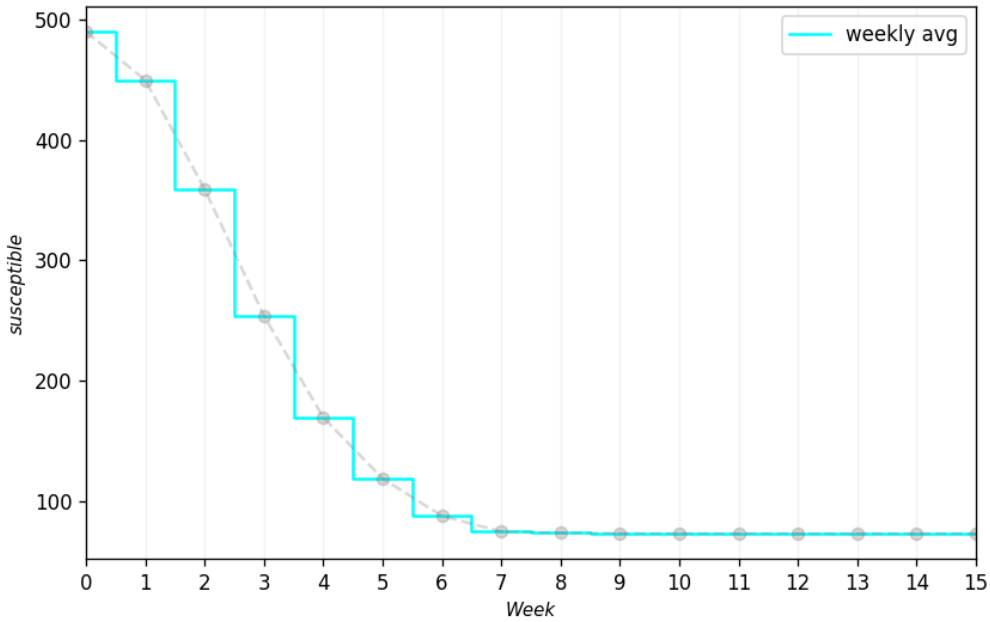
1.3 Simulate epidemic on random graph with vaccination

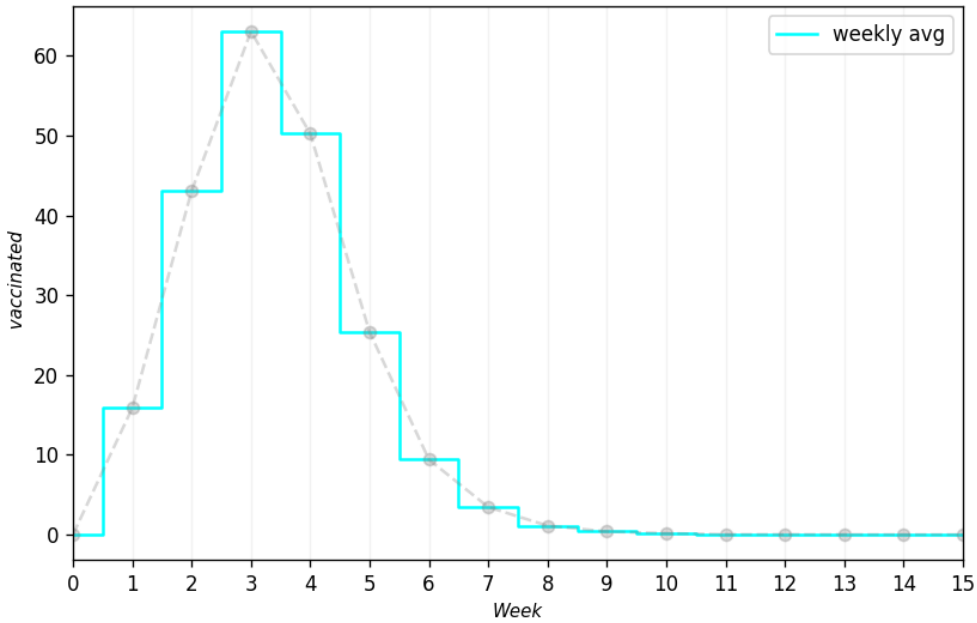



weekly avg
New infected avg
Week
0
10
20
30
40
50
60
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15


weekly avg
New vaccinated avg
Week
0
10
20
30
40
50
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

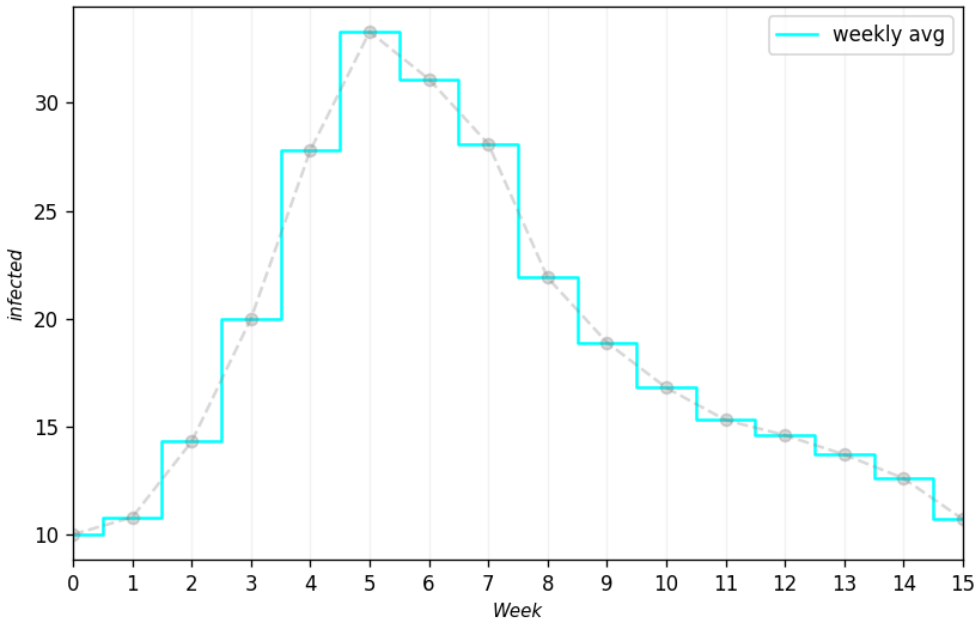

weekly avg
recovered
Week
0
20
40
60
80
100
120
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

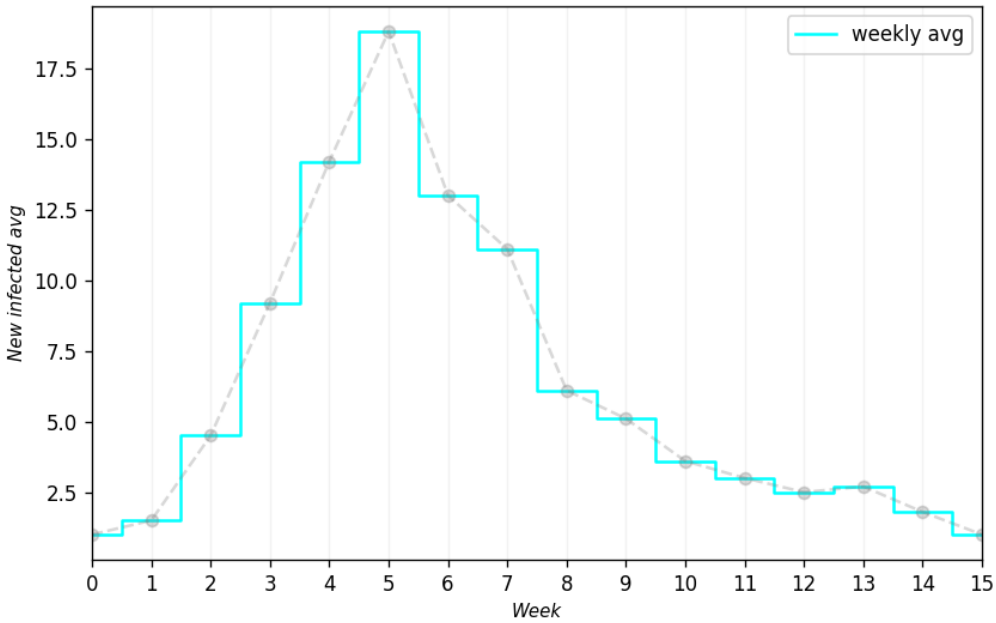

weekly avg
susceptible
Week
100
200
300
400
500
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

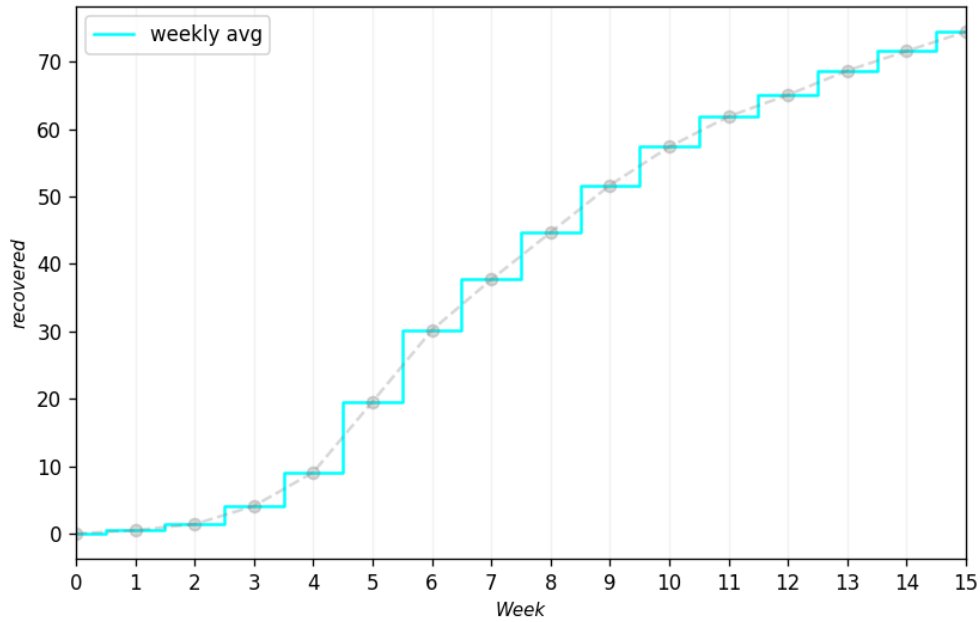


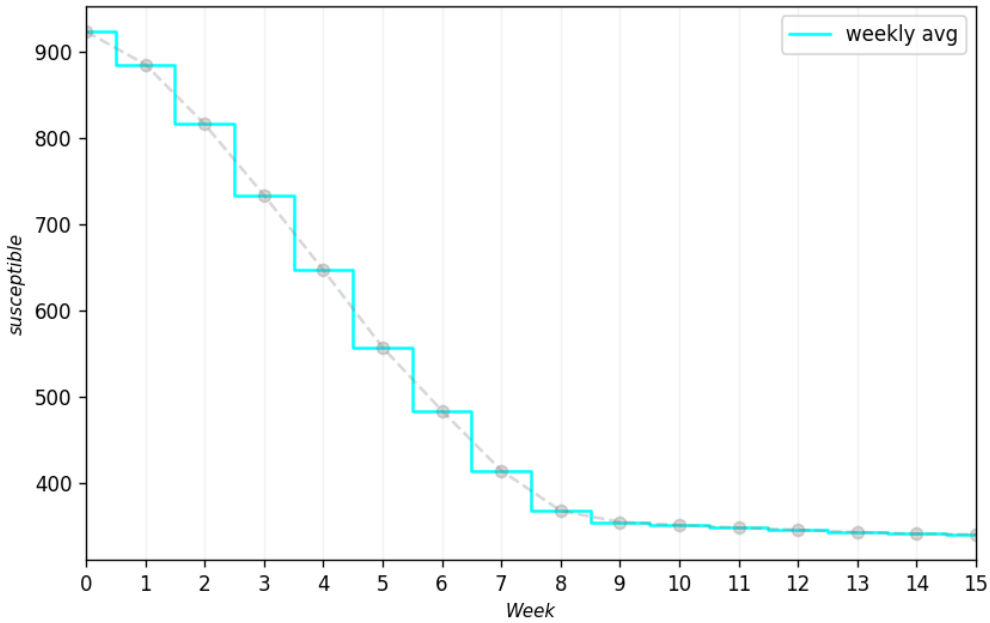
1.4 Simulate H1N1 pandemic in Sweden 2009

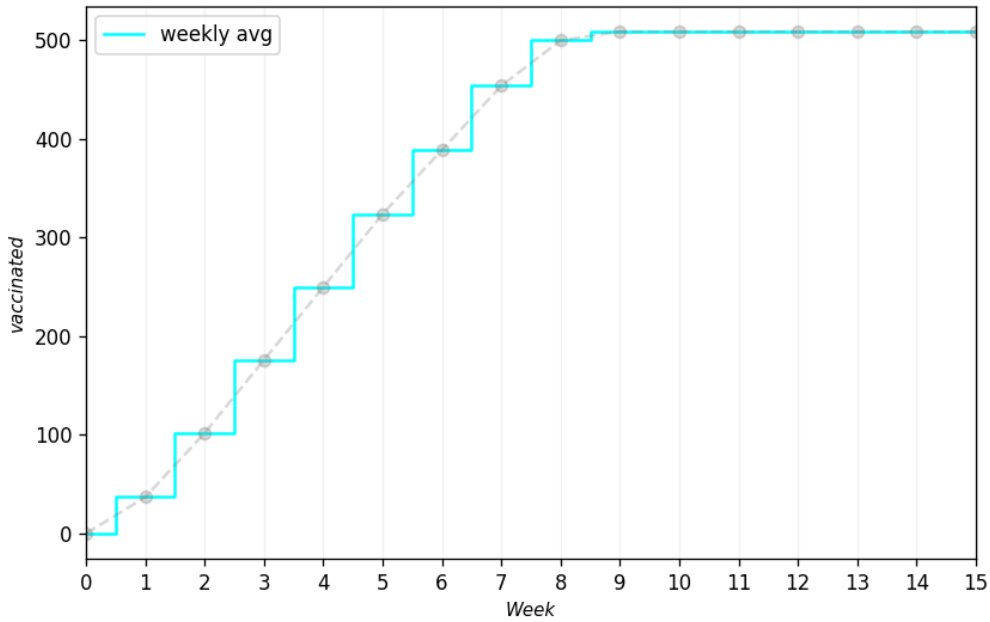
Δk, Δβ, and Δρ are adaptive. If we cannot find a better value before a certain time threshold, we reduce those deltas by half.




weekly avg
New infected avg
Week
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15


weekly avg
recovered
Week
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15





best_parameters

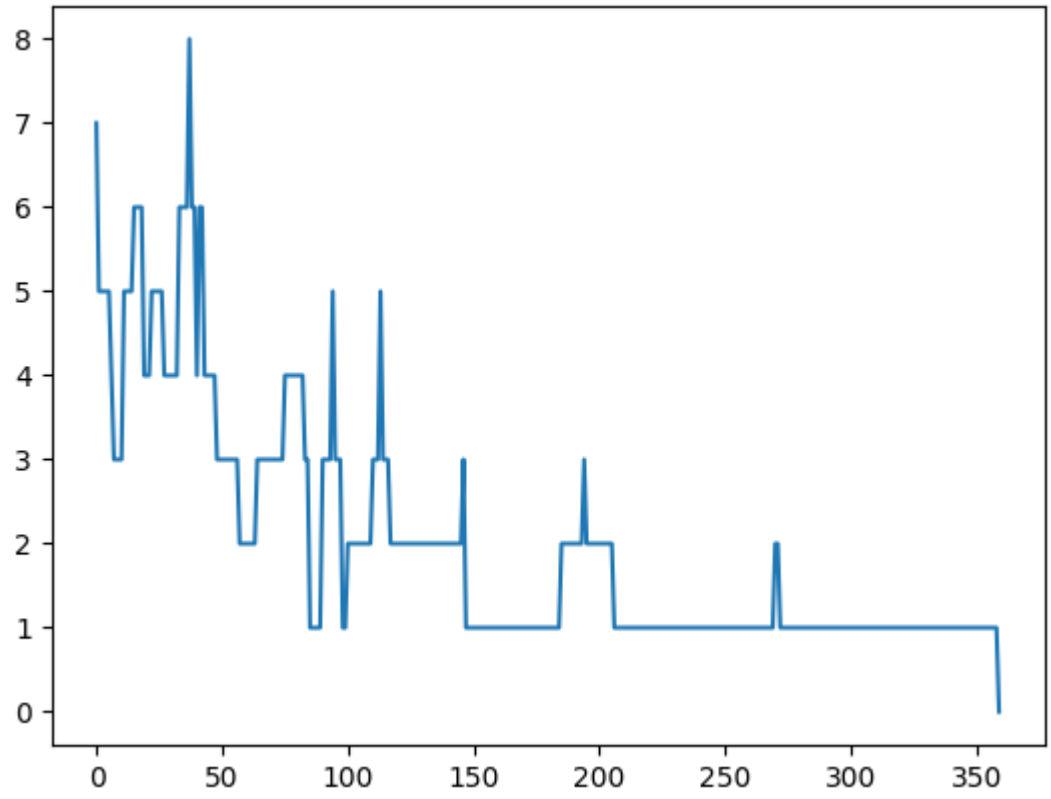
k = 12

beta = 0.11249999999999998

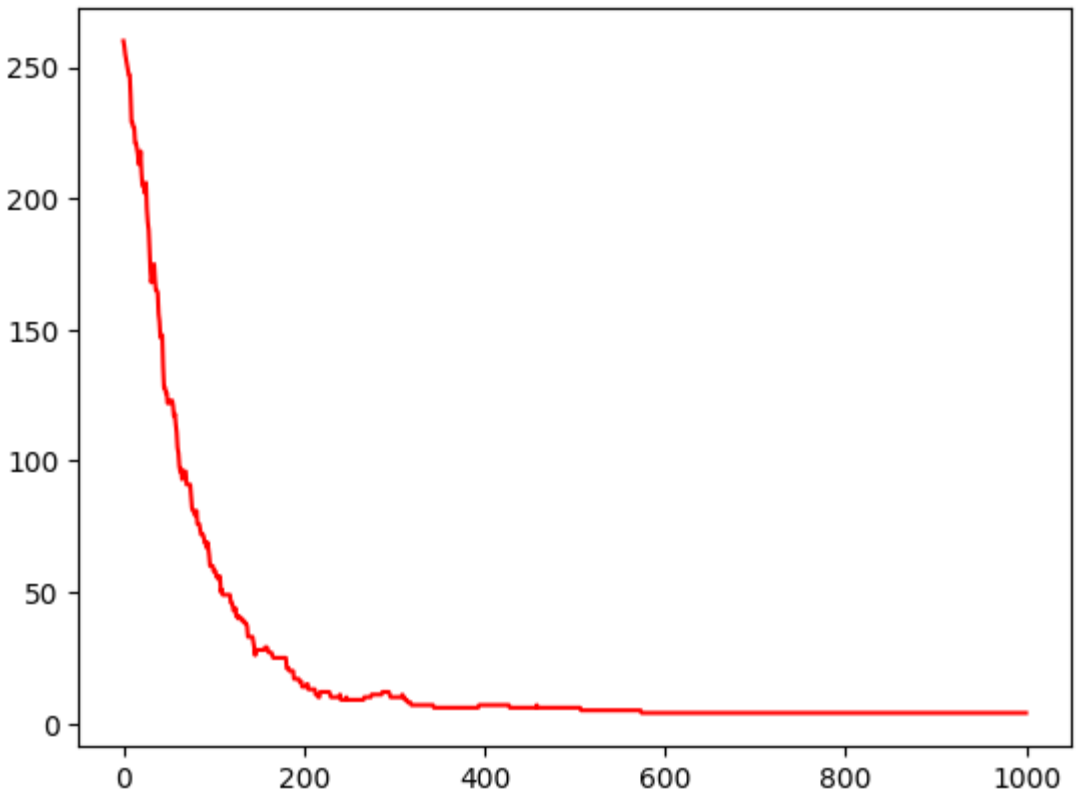
rho = 0.5875

2 Coloring

potential graph on simple line graph



potential graph wifi.mat test case 1



potential graph wifi.mat test case 2