

DQN visualization

Minyoung Jeong

Yonsei Univ.

2023. 01. 13.

Initial condition

SIR model

max time: 30

epsilon start: 1

epsilon decay: 0.995

epsilon end: 0.001

S0: 9990

I0: 10

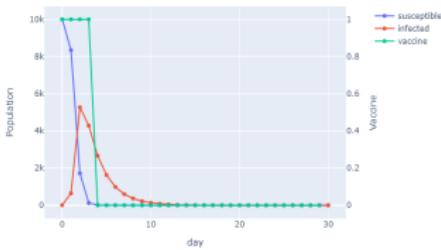
gamma: 0.5

beta: 0.0005, 0.0010

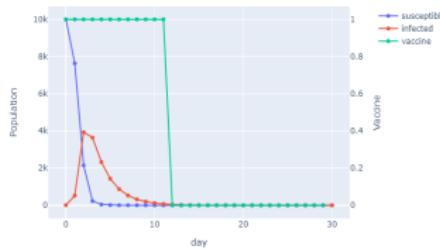
nu: 0.1, 0.2

S, I, Vaccination

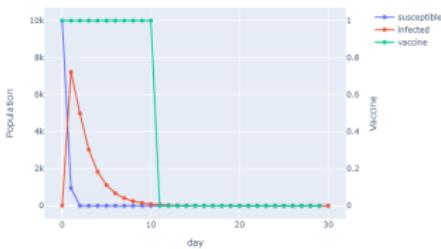
-17014.01: SIR model with control



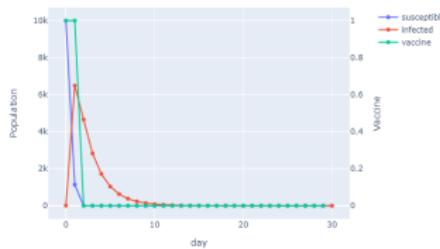
-14069.17: SIR model with control



-19896.77: SIR model with control

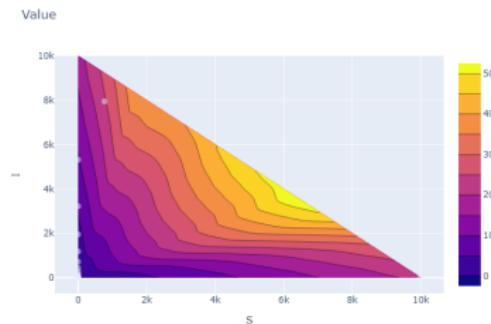
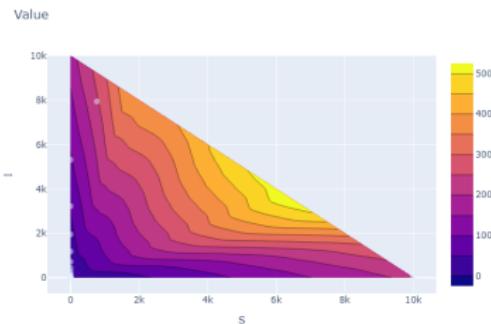
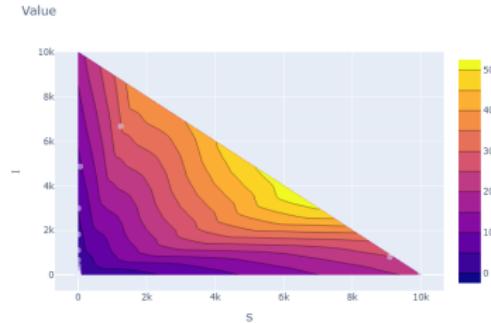
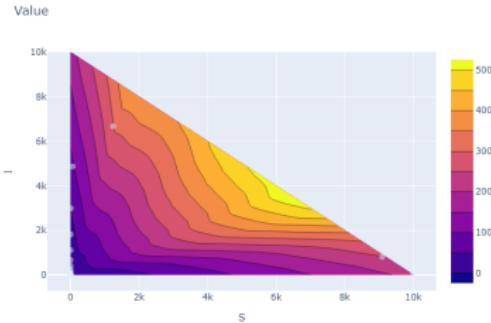


-18309.22: SIR model with control



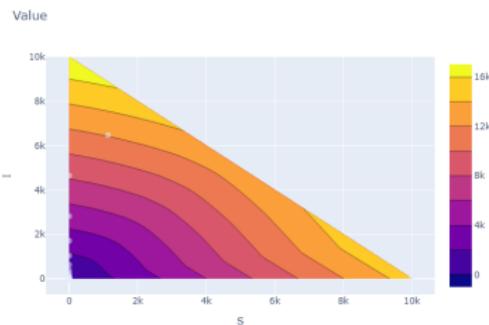
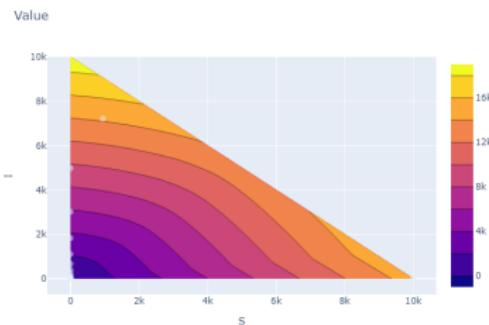
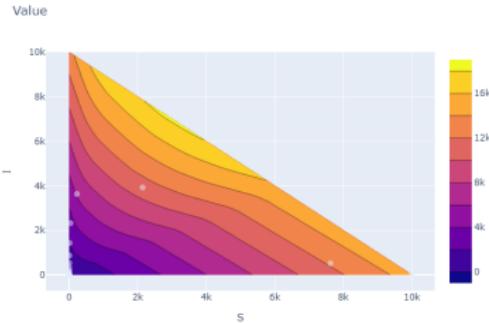
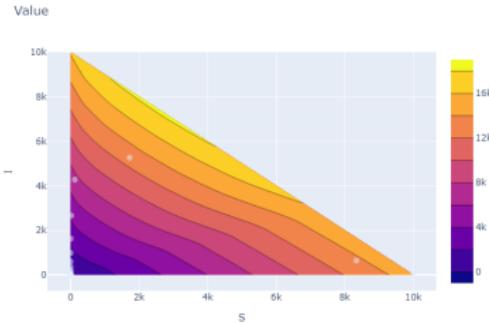
$$(\nu, \beta) = (0.1, 0.0005), (0.2, 0.0005), (0.1, 0.0010), (0.2, 0.0010)$$

Initial Value



$$(\nu, \beta) = (0.1, 0.0005), (0.2, 0.0005), (0.1, 0.0010), (0.2, 0.0010)$$

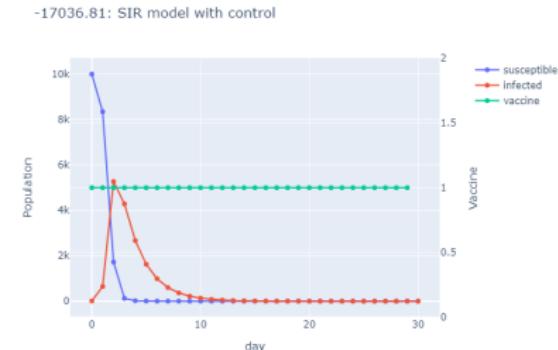
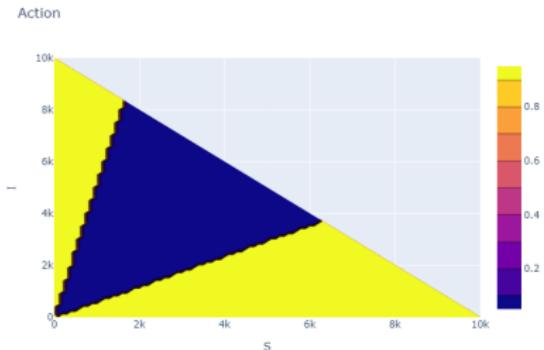
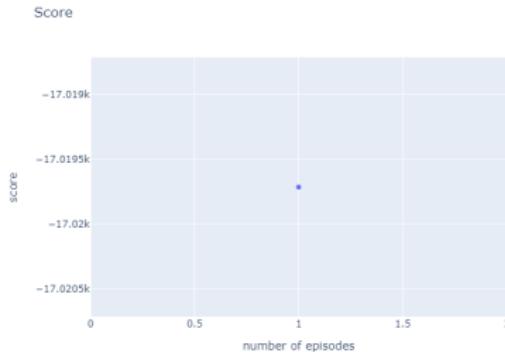
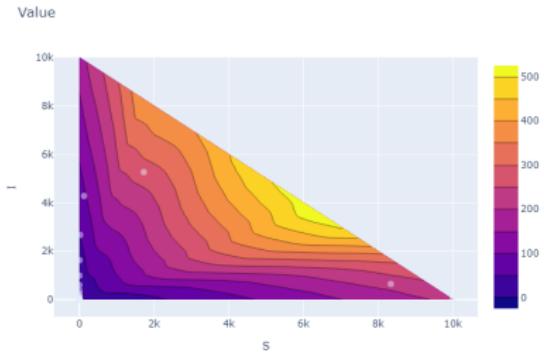
Value after 2000 episodes



$(\nu, \beta) = (0.1, 0.0005), (0.2, 0.0005), (0.1, 0.0010), (0.2, 0.0010)$

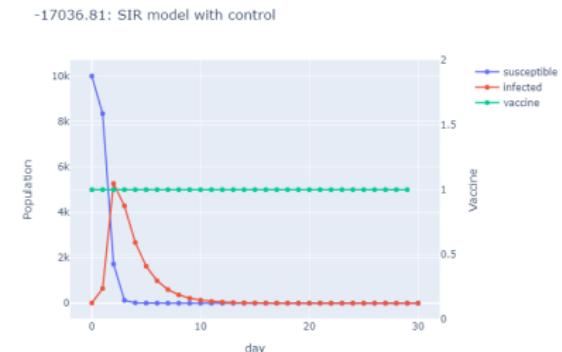
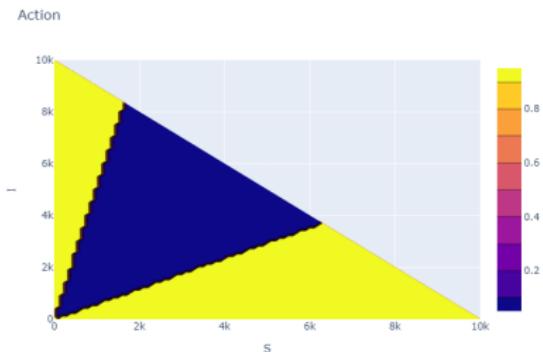
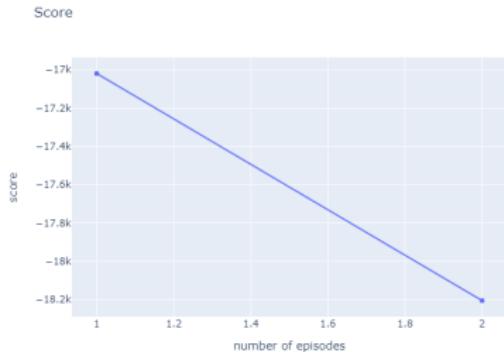
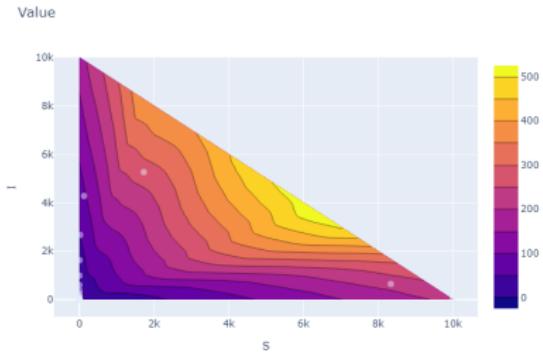
Case 1_ nu=0.1, beta=0.0005

After 1 episodes learning:



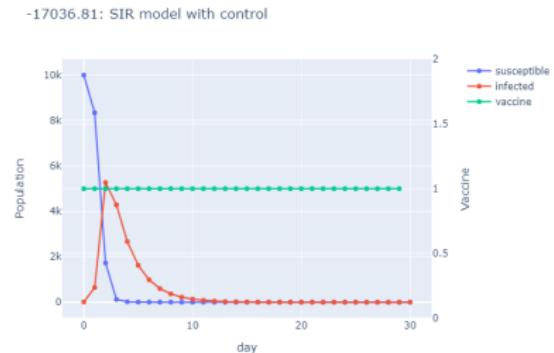
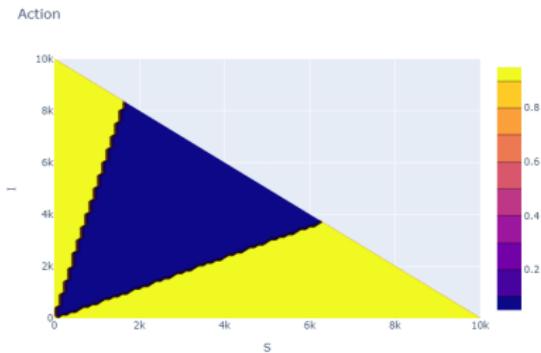
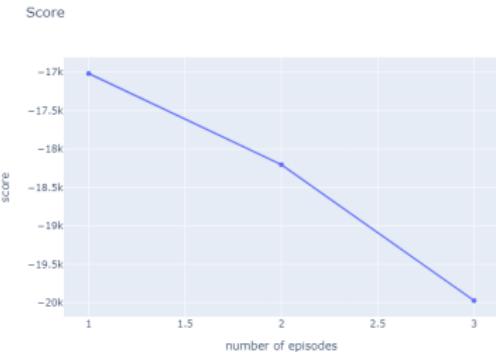
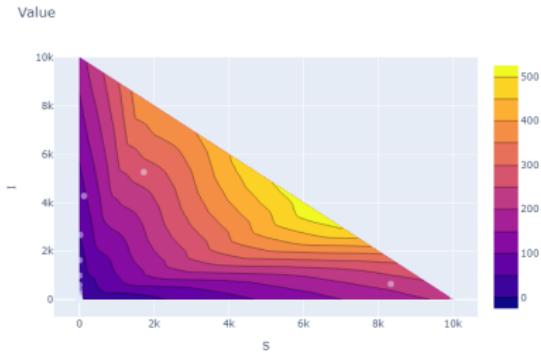
Case 1_ nu=0.1, beta=0.0005

After 2 episodes learning:



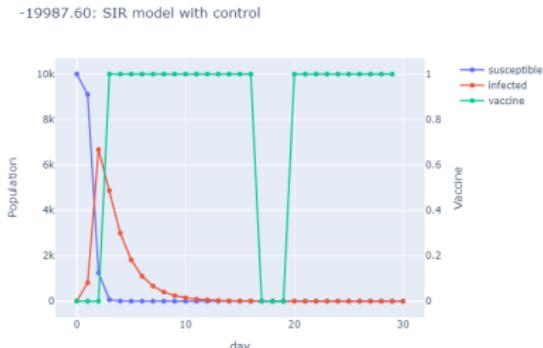
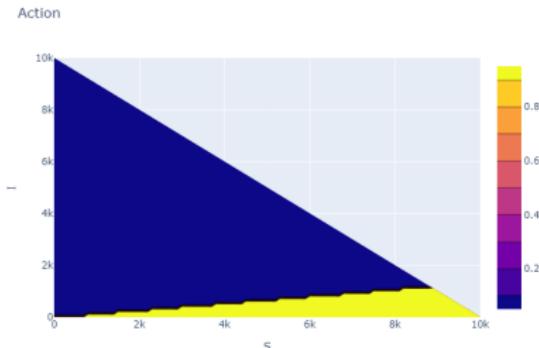
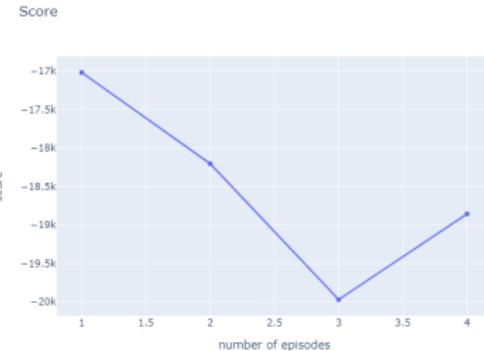
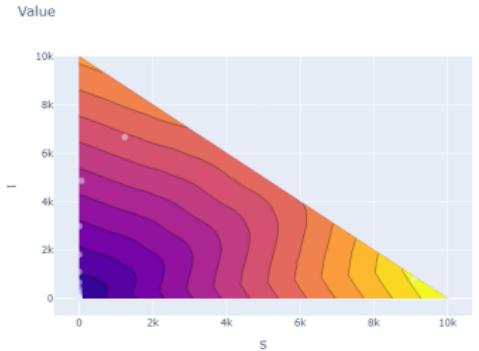
Case 1_ nu=0.1, beta=0.0005

After 3 episodes learning:



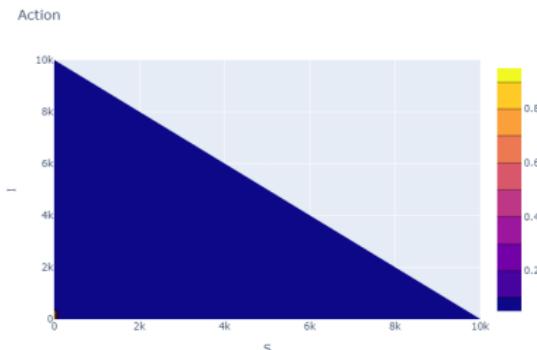
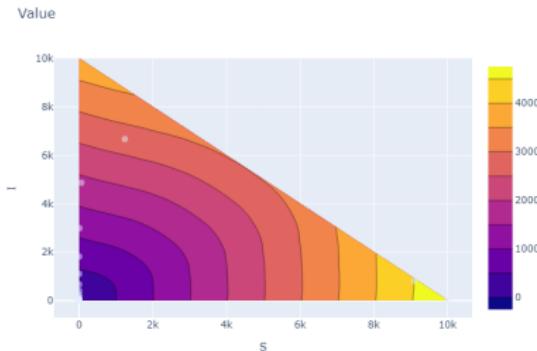
Case 1_ nu=0.1, beta=0.0005

After 4 episodes learning:



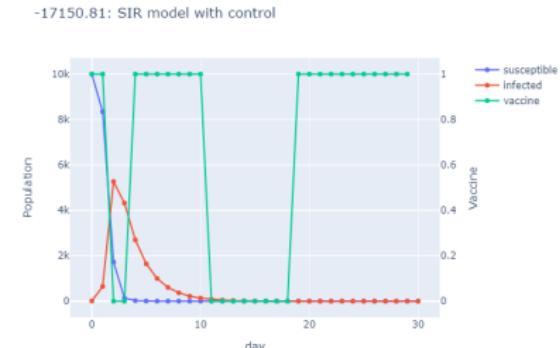
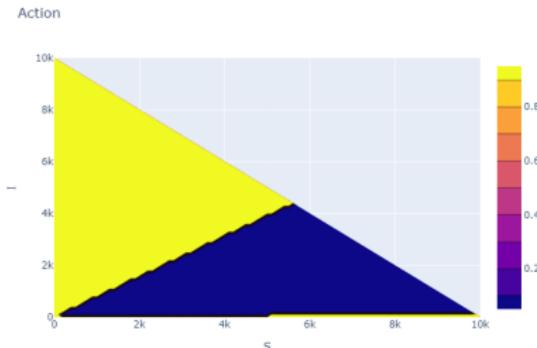
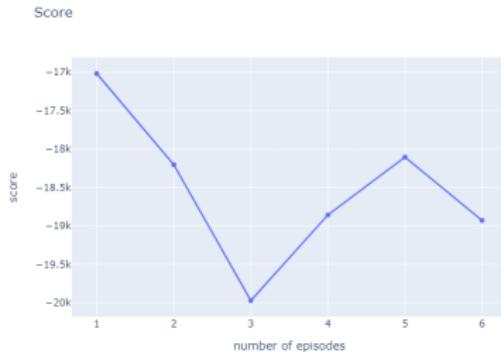
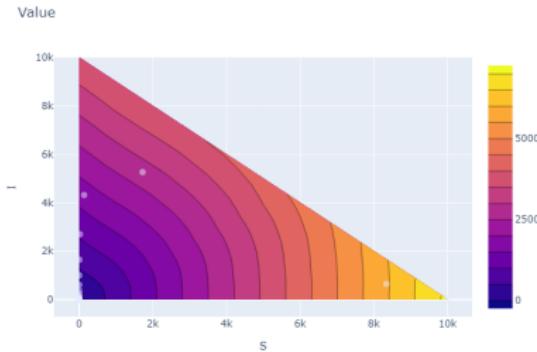
Case 1_ nu=0.1, beta=0.0005

After 5 episodes learning:



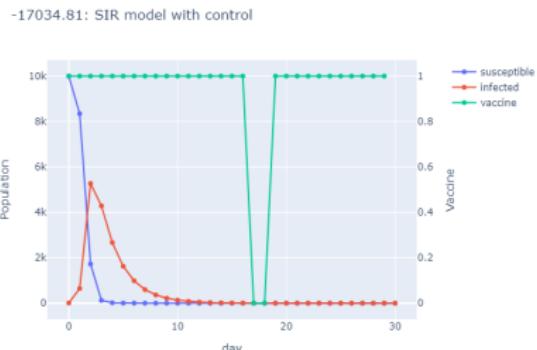
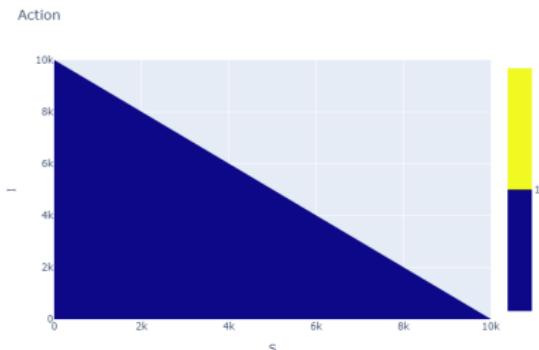
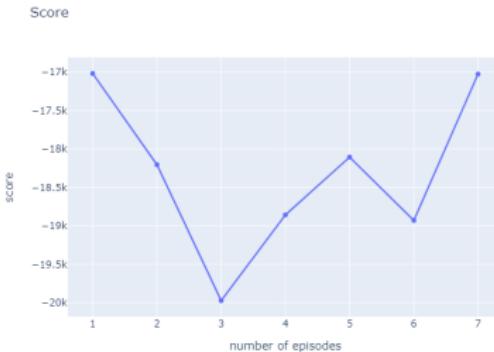
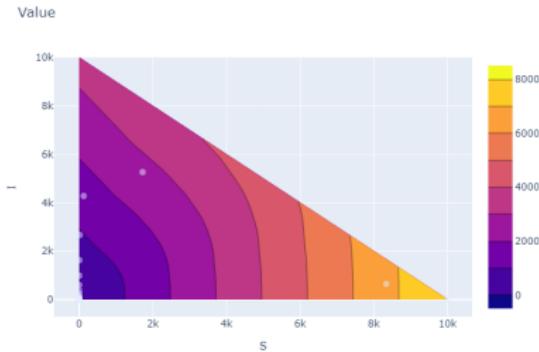
Case 1_ nu=0.1, beta=0.0005

After 6 episodes learning:



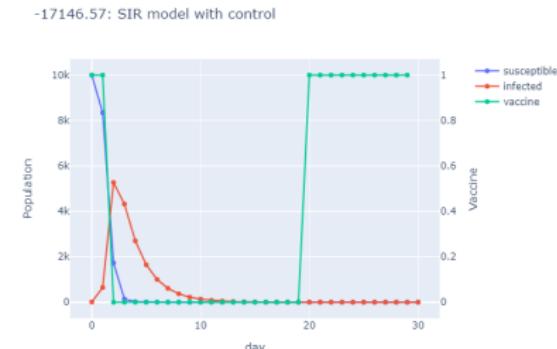
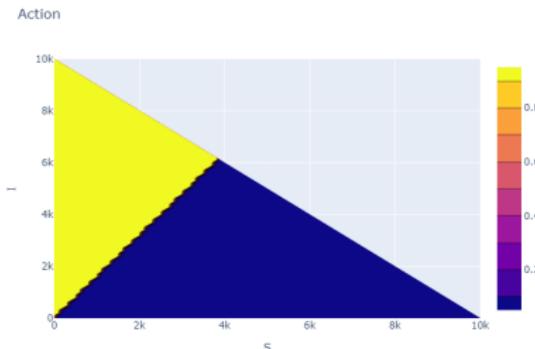
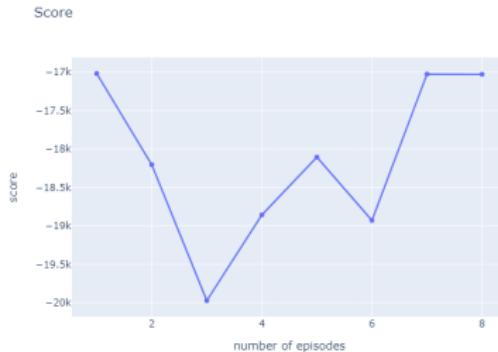
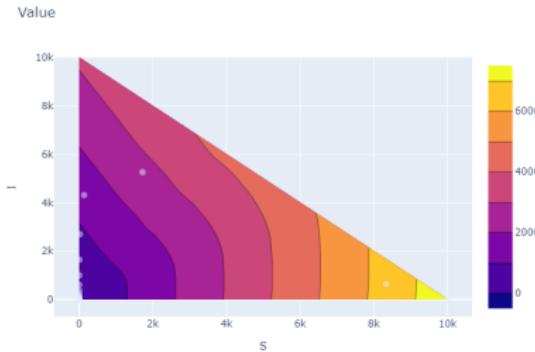
Case 1_ nu=0.1, beta=0.0005

After 7 episodes learning:



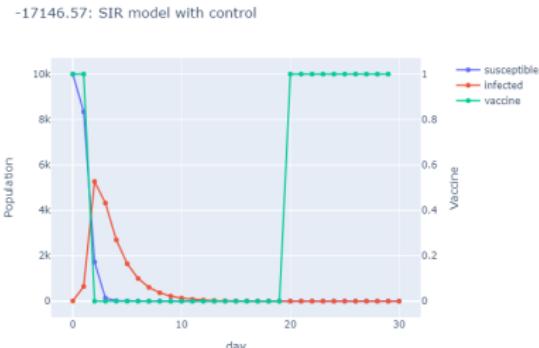
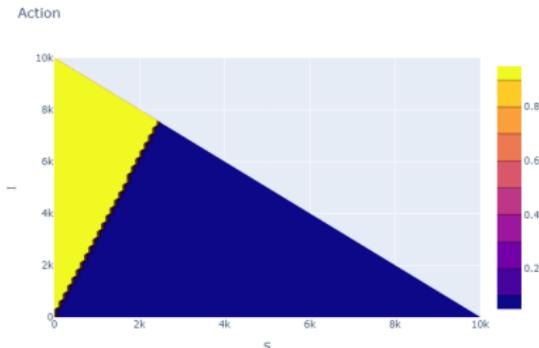
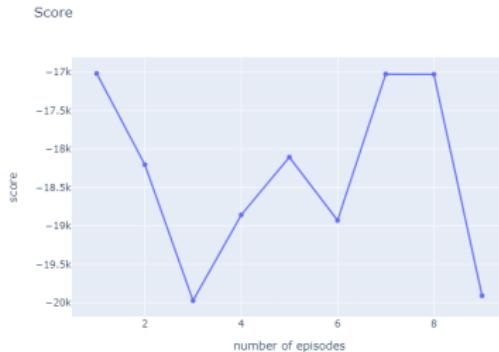
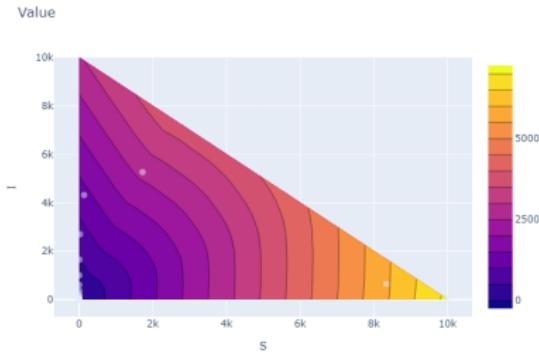
Case 1_ nu=0.1, beta=0.0005

After 8 episodes learning:



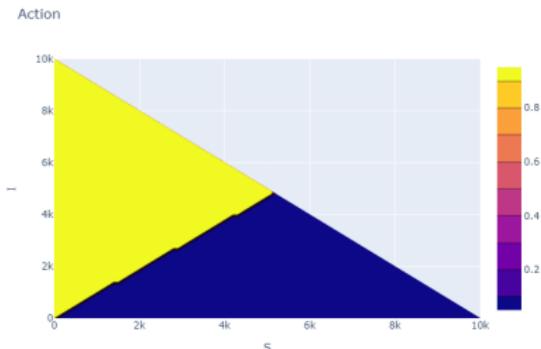
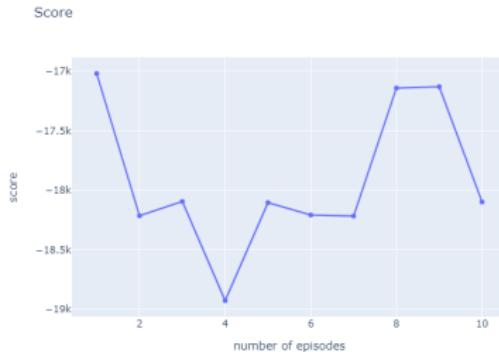
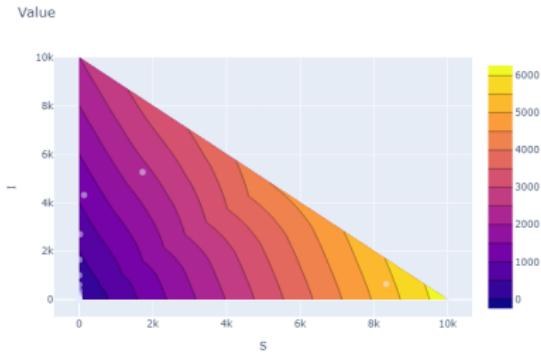
Case 1_ nu=0.1, beta=0.0005

After 9 episodes learning:



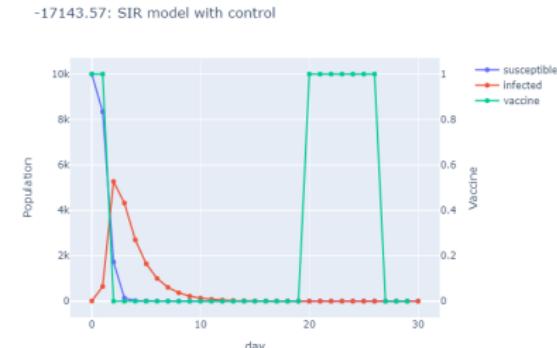
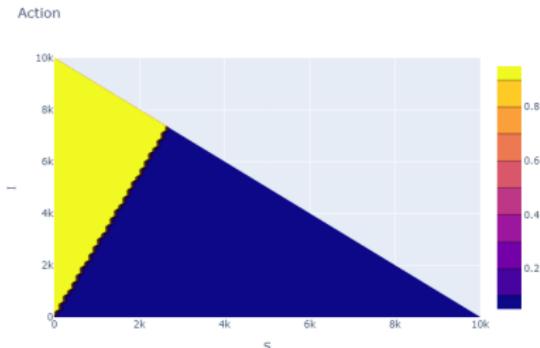
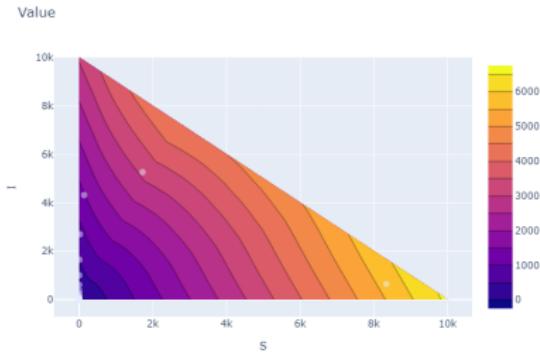
Case 1_ nu=0.1, beta=0.0005

After 10 episodes learning:



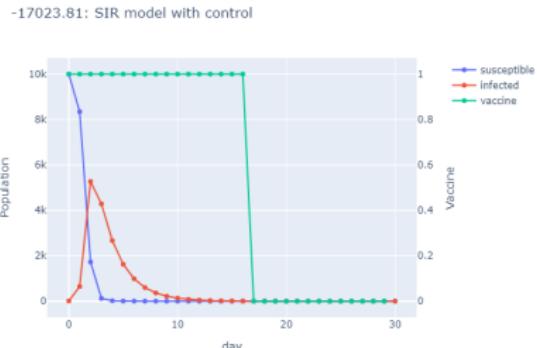
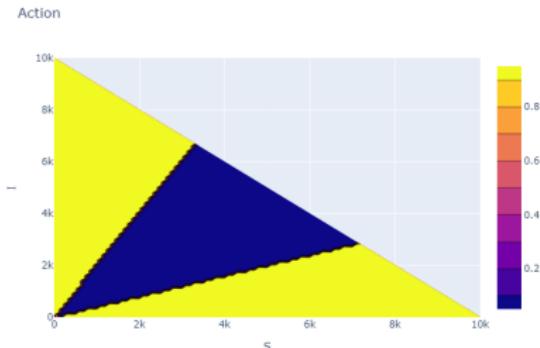
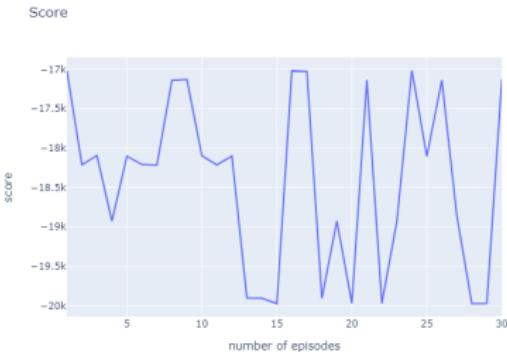
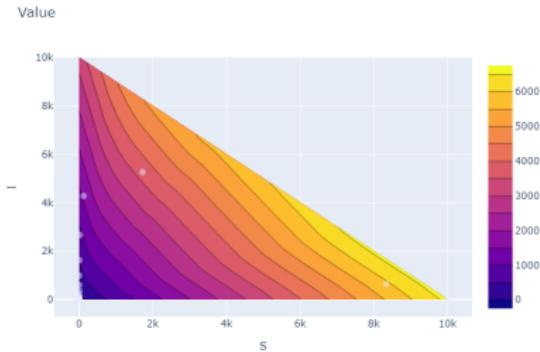
Case 1_ nu=0.1, beta=0.0005

After 20 episodes learning:



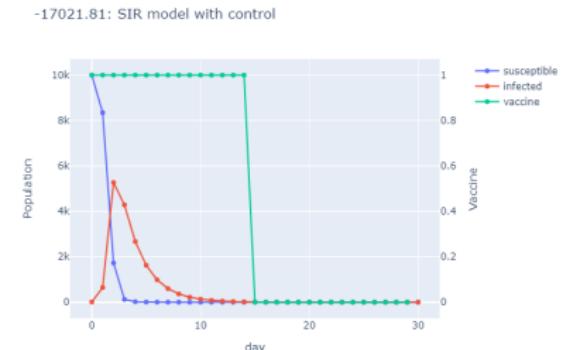
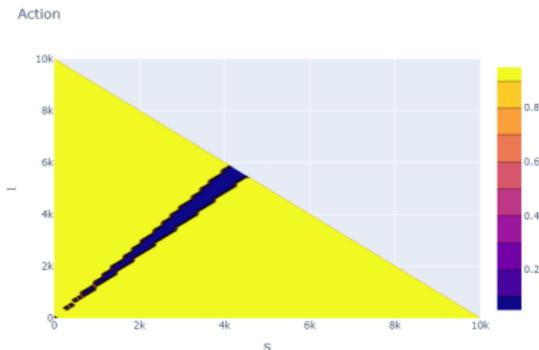
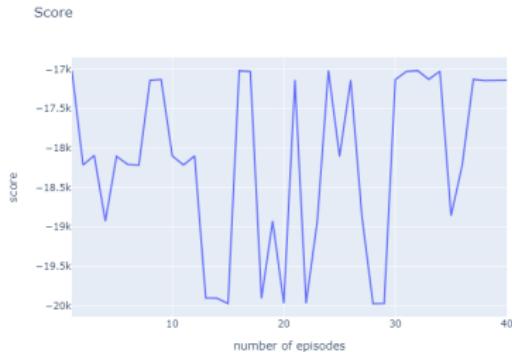
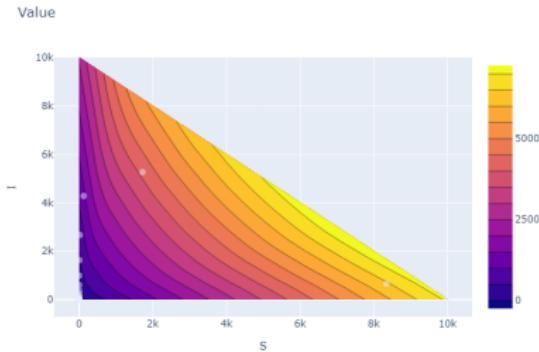
Case 1_ nu=0.1, beta=0.0005

After 30 episodes learning:



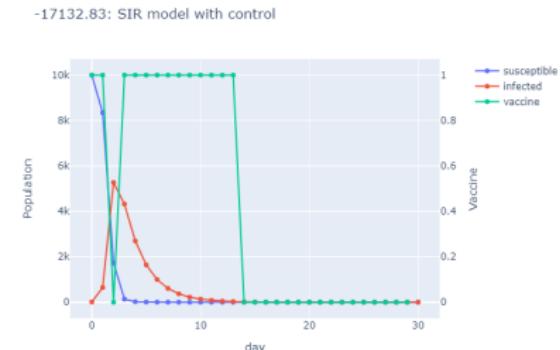
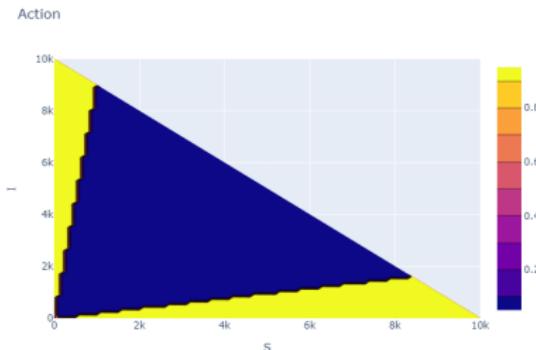
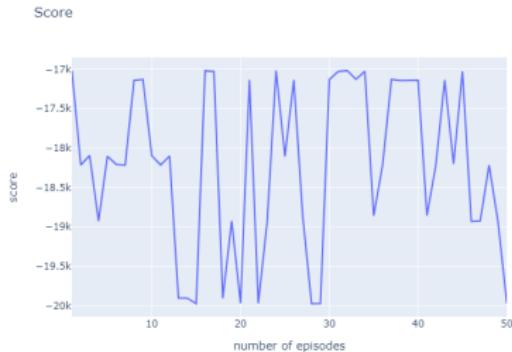
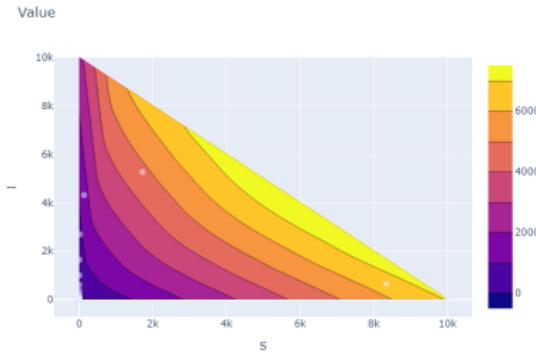
Case 1_ nu=0.1, beta=0.0005

After 40 episodes learning:



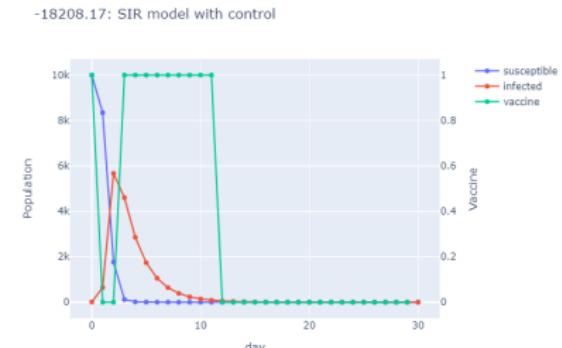
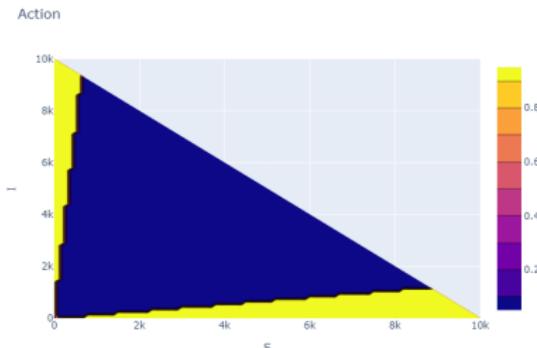
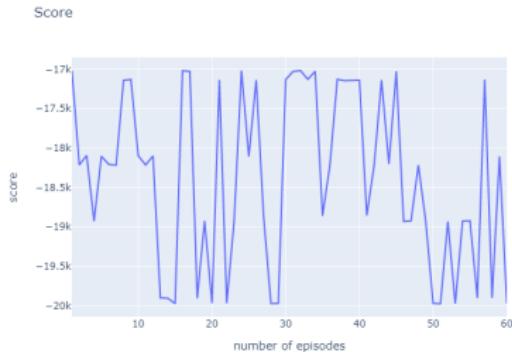
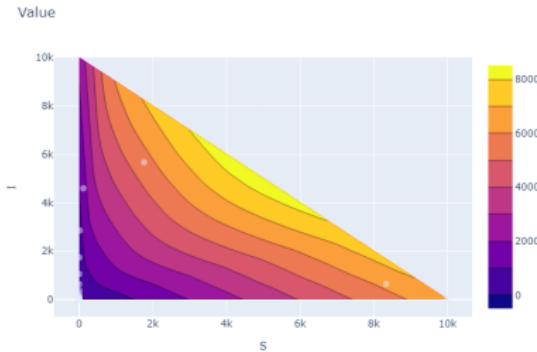
Case 1_ nu=0.1, beta=0.0005

After 50 episodes learning:



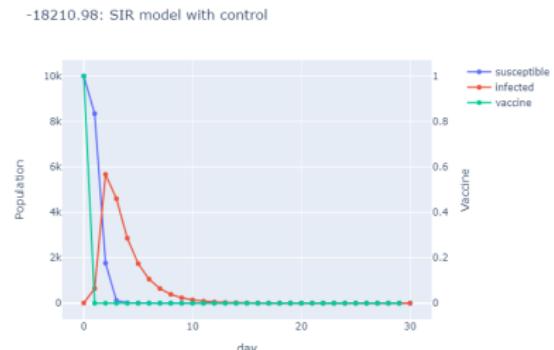
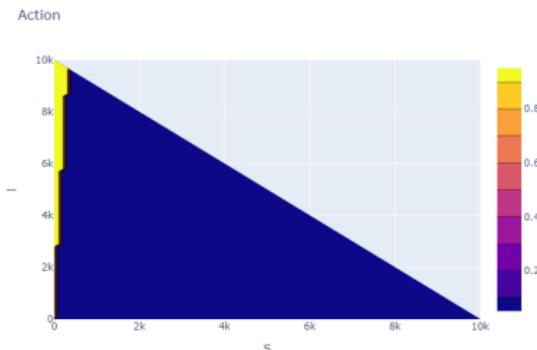
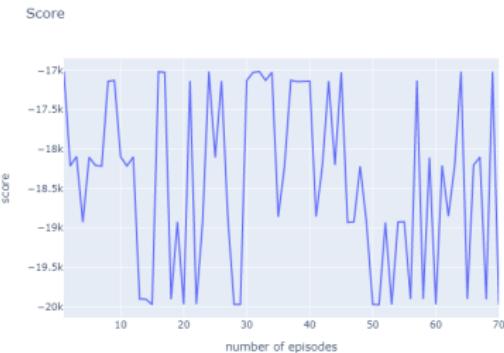
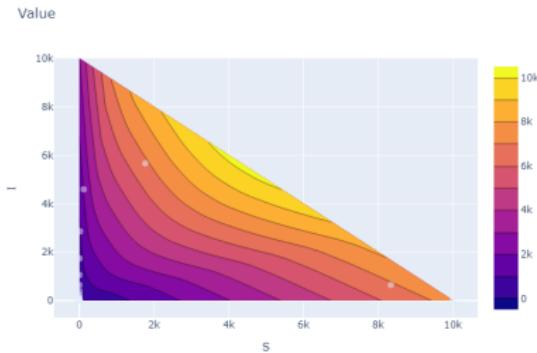
Case 1_ nu=0.1, beta=0.0005

After 60 episodes learning:



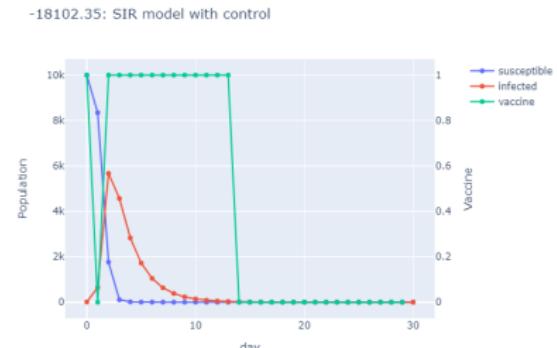
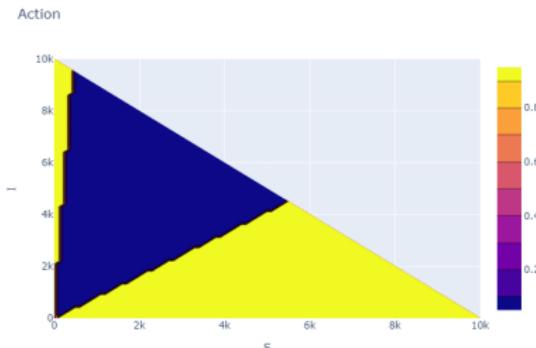
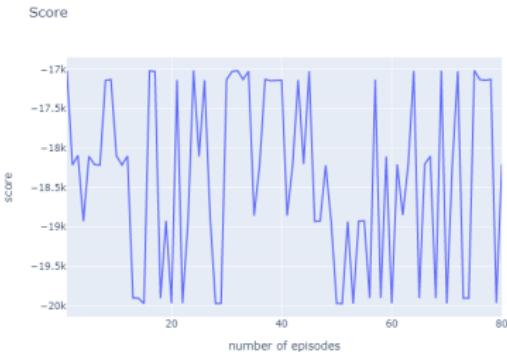
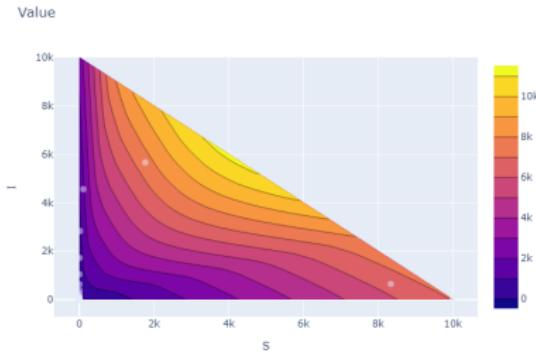
Case 1_ nu=0.1, beta=0.0005

After 70 episodes learning:



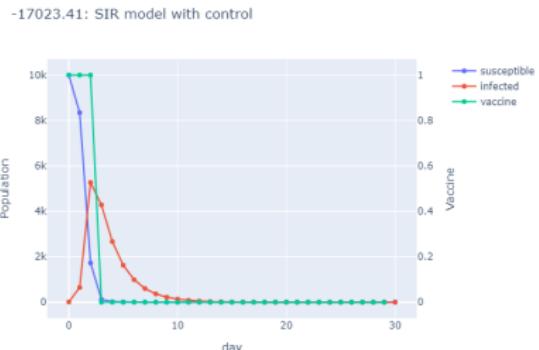
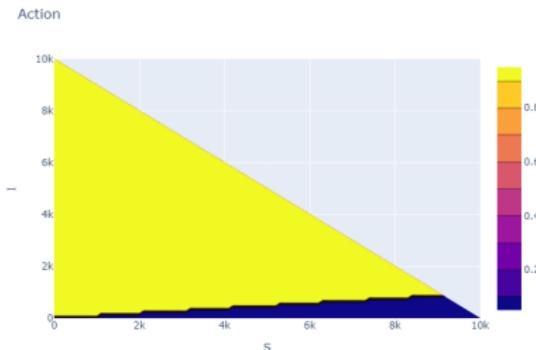
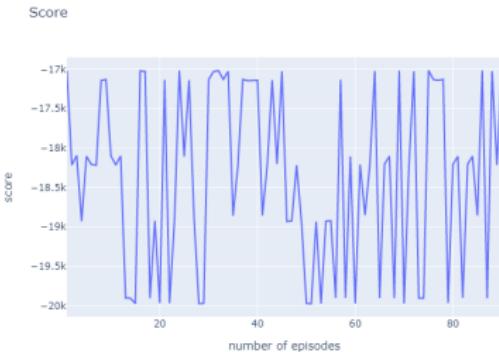
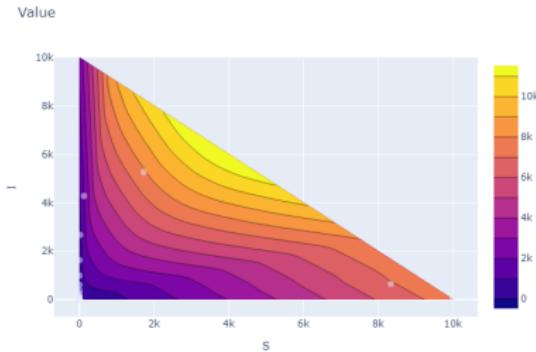
Case 1_ nu=0.1, beta=0.0005

After 80 episodes learning:



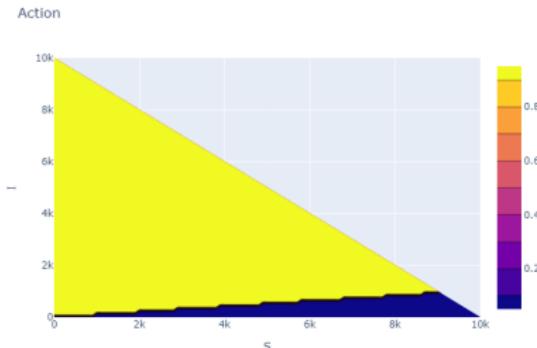
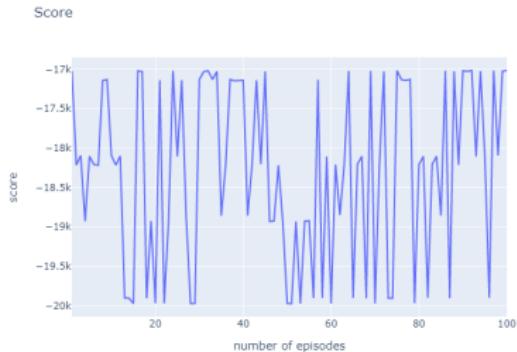
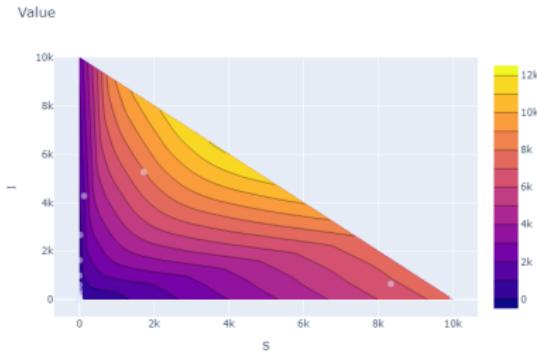
Case 1_ nu=0.1, beta=0.0005

After 90 episodes learning:



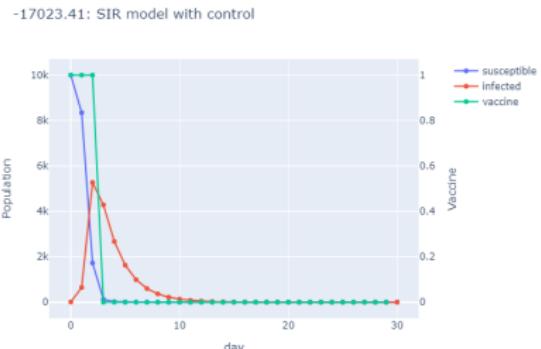
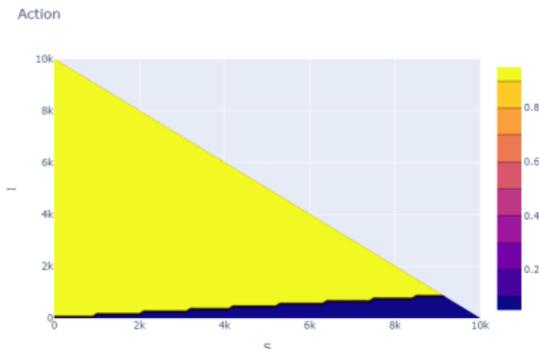
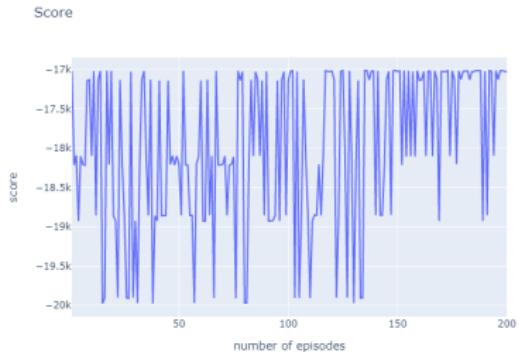
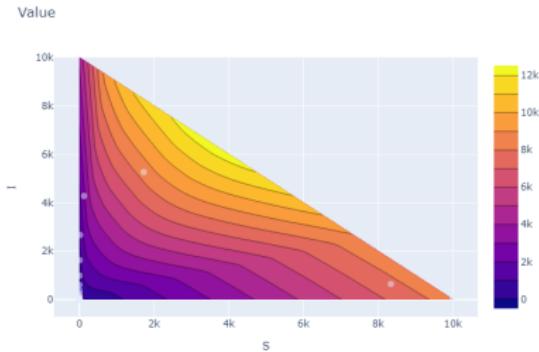
Case 1_ nu=0.1, beta=0.0005

After 100 episodes learning:



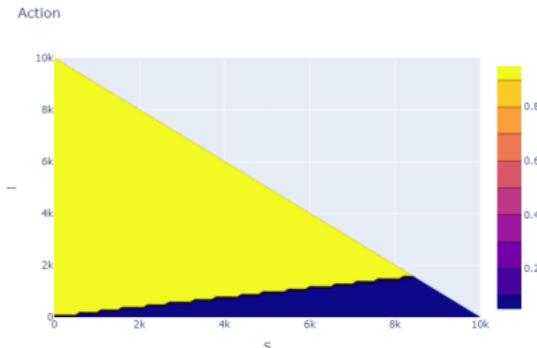
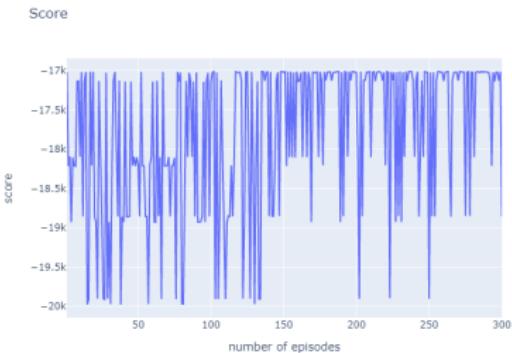
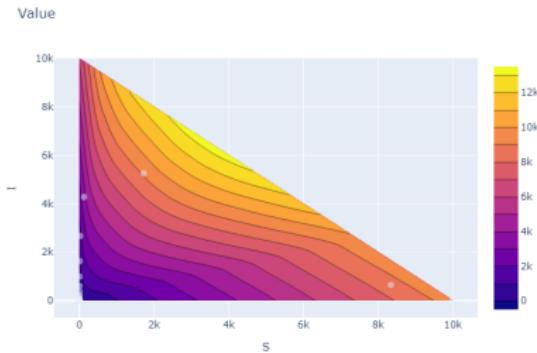
Case 1_ nu=0.1, beta=0.0005

After 200 episodes learning:



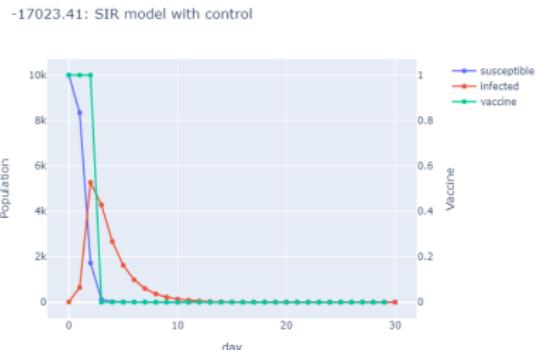
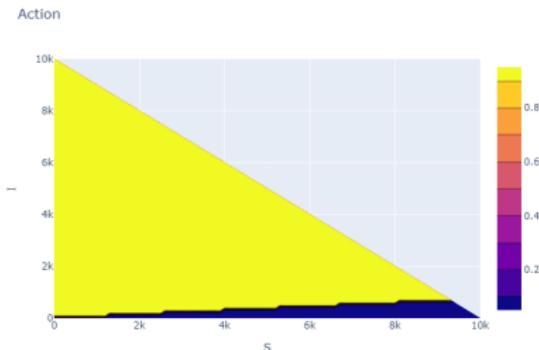
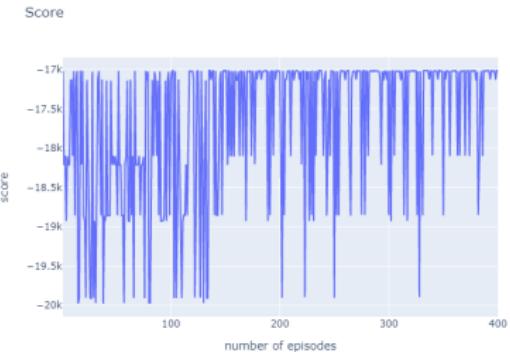
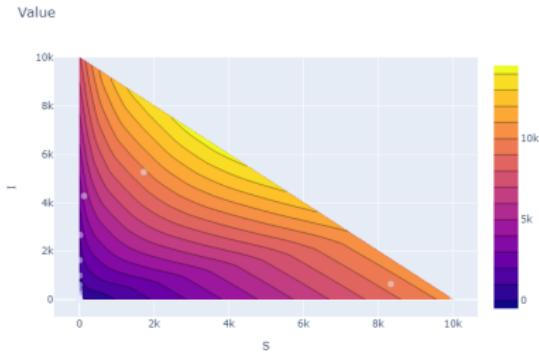
Case 1_ nu=0.1, beta=0.0005

After 300 episodes learning:



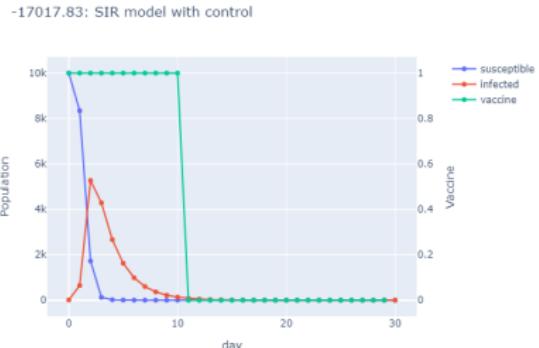
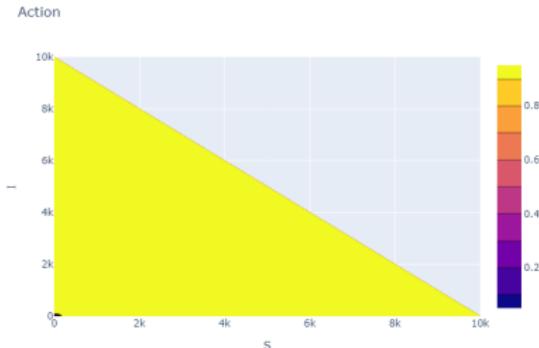
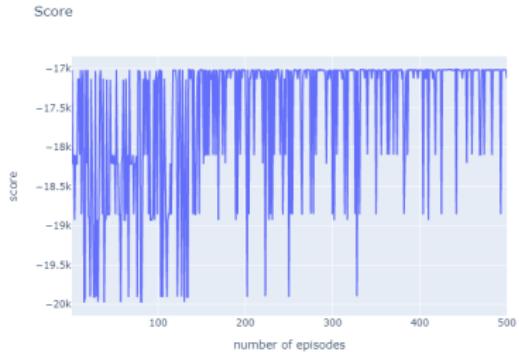
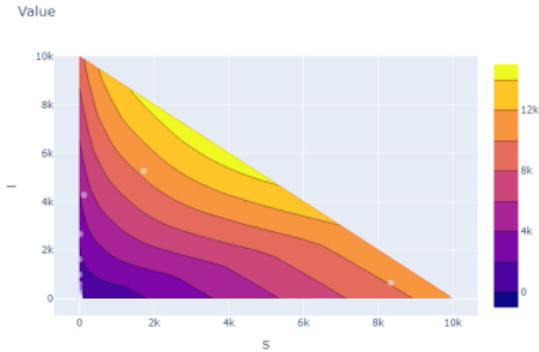
Case 1_ nu=0.1, beta=0.0005

After 400 episodes learning:



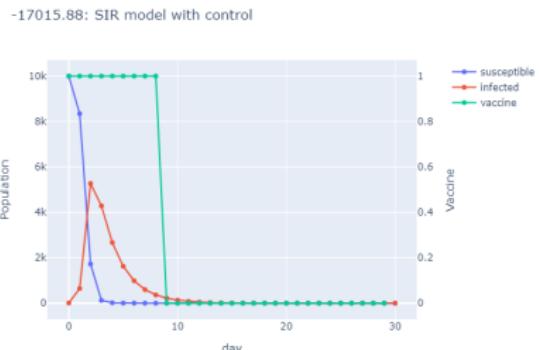
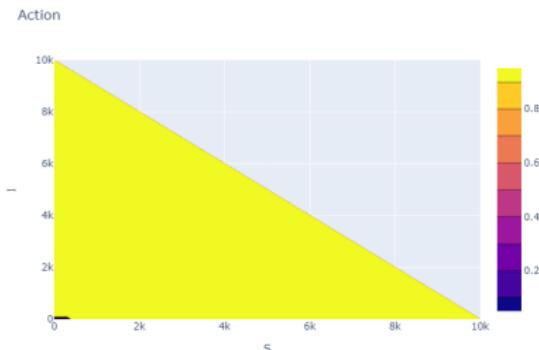
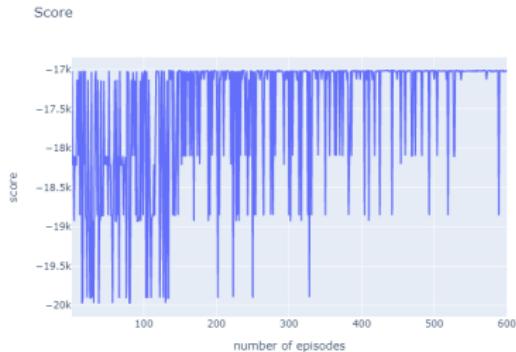
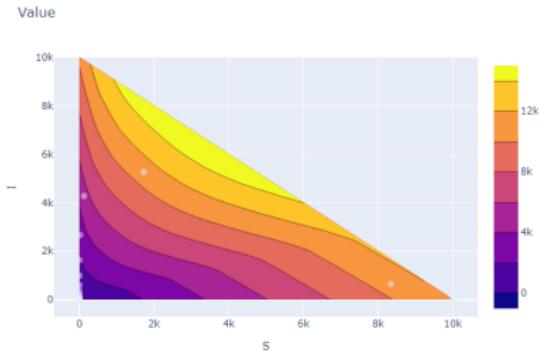
Case 1_ nu=0.1, beta=0.0005

After 500 episodes learning:



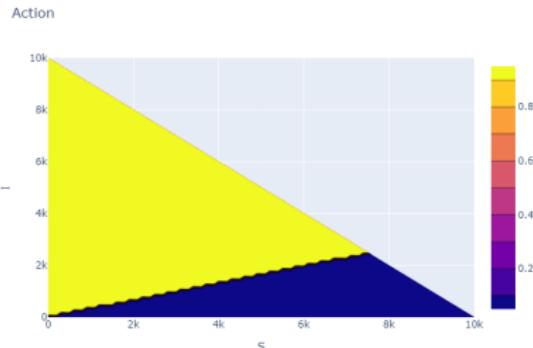
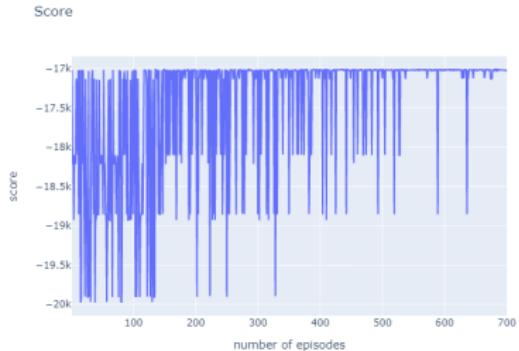
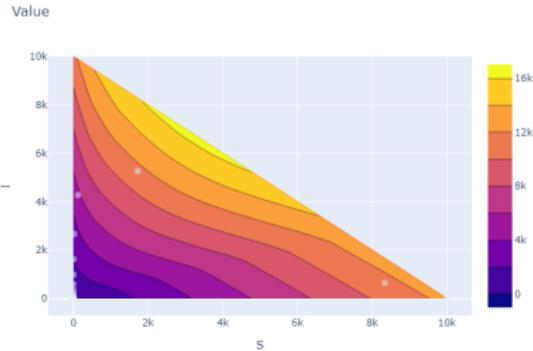
Case 1_ nu=0.1, beta=0.0005

After 600 episodes learning:



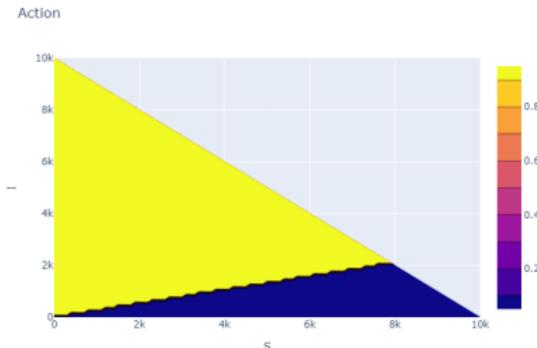
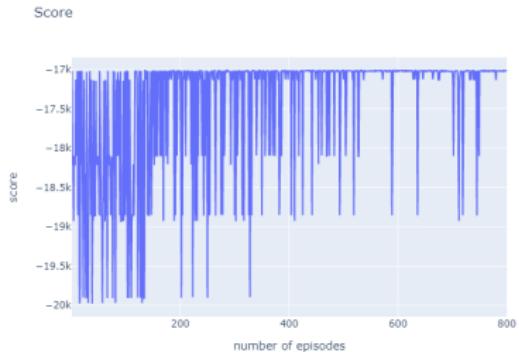
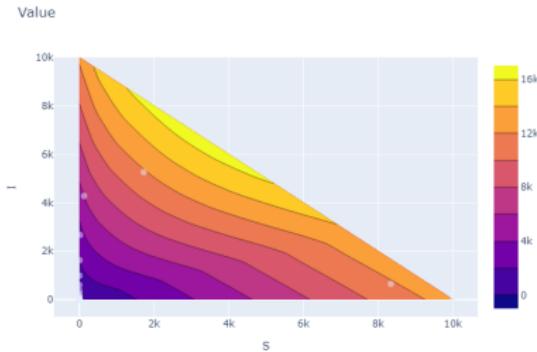
Case 1_ nu=0.1, beta=0.0005

After 700 episodes learning:



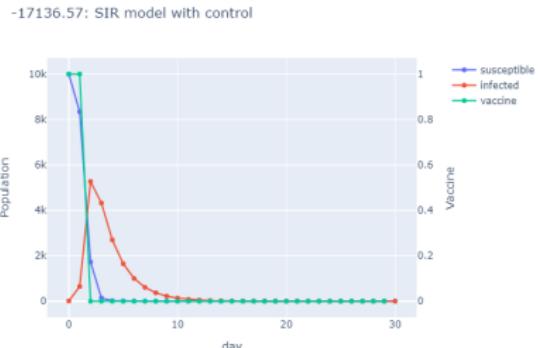
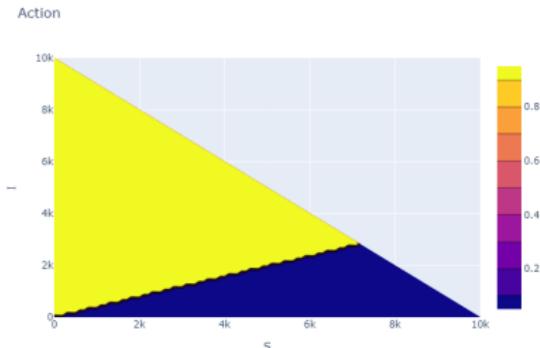
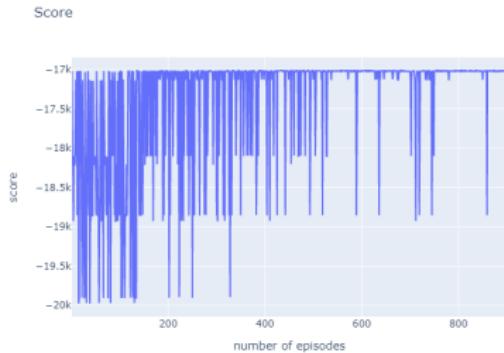
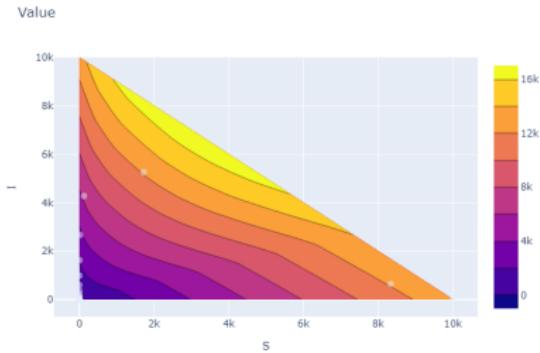
Case 1_ nu=0.1, beta=0.0005

After 800 episodes learning:



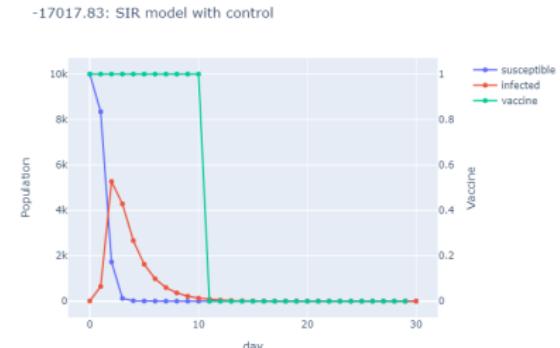
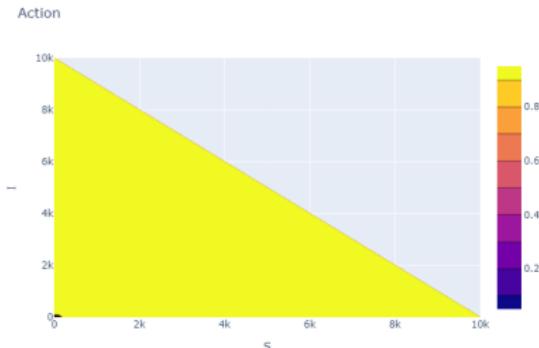
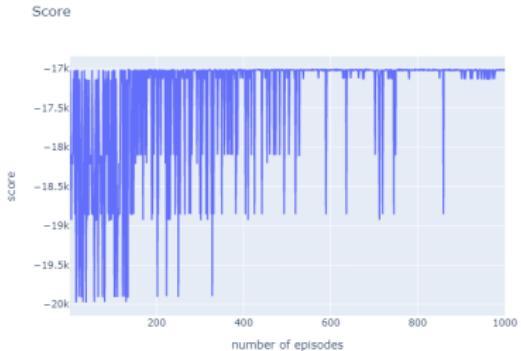
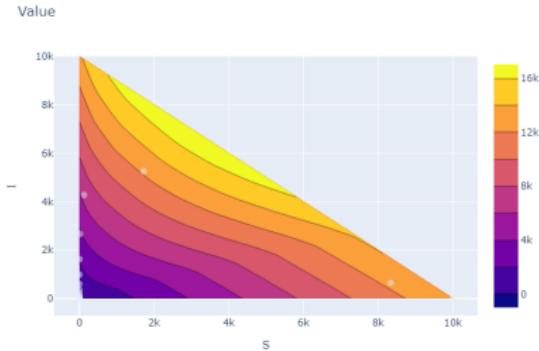
Case 1_ nu=0.1, beta=0.0005

After 900 episodes learning:



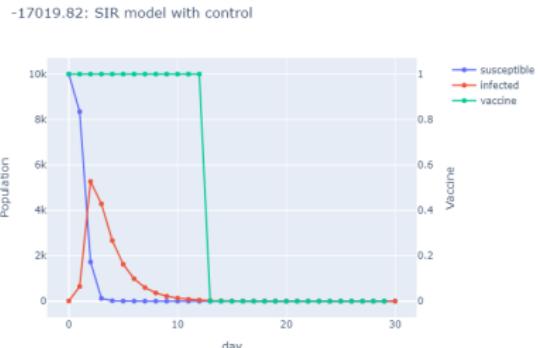
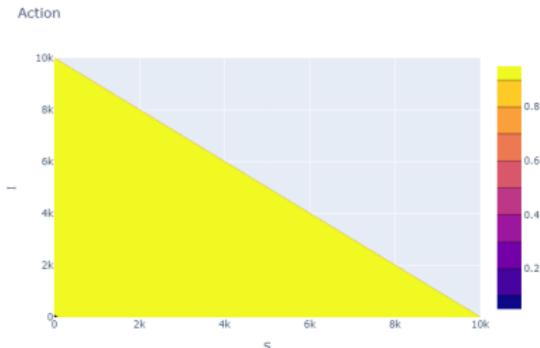
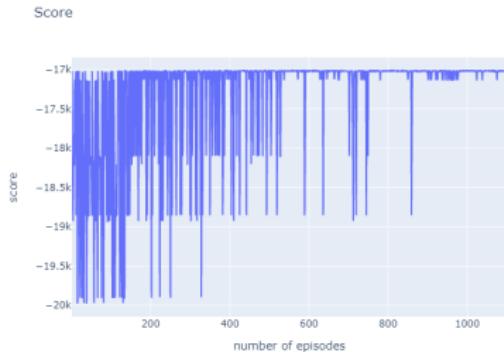
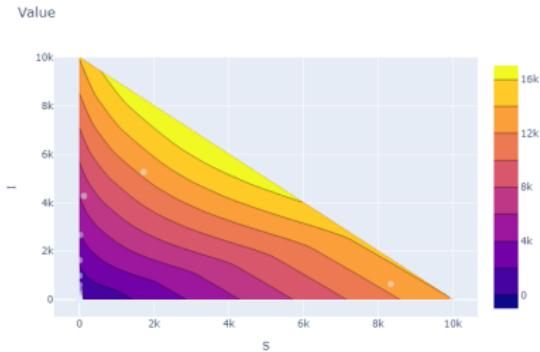
Case 1_ nu=0.1, beta=0.0005

After 1000 episodes learning:



Case 1_ nu=0.1, beta=0.0005

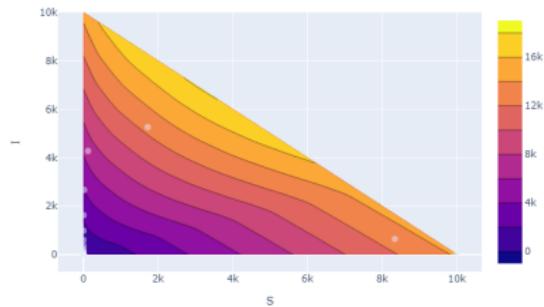
After 1100 episodes learning:



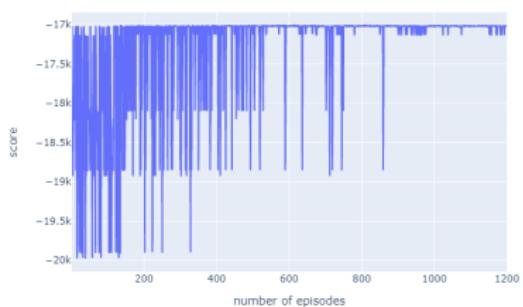
Case 1_ nu=0.1, beta=0.0005

After 1200 episodes learning:

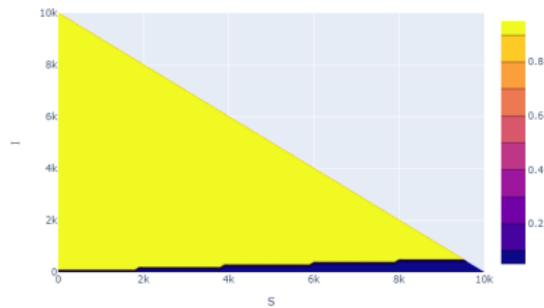
Value



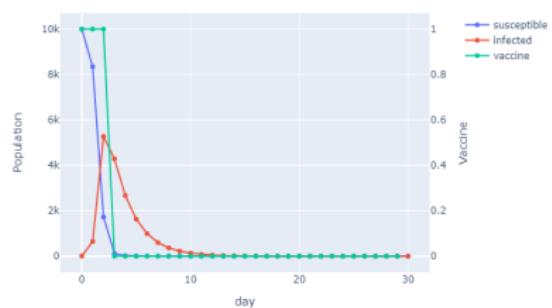
Score



Action

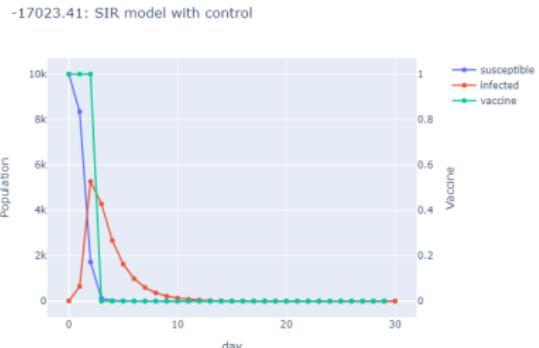
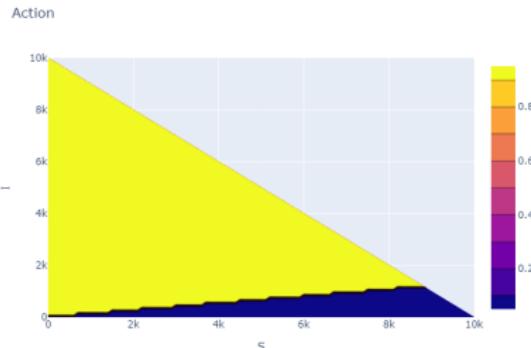
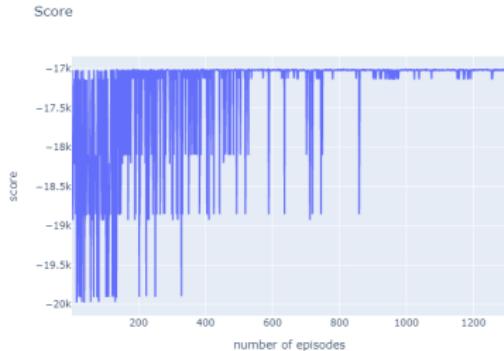
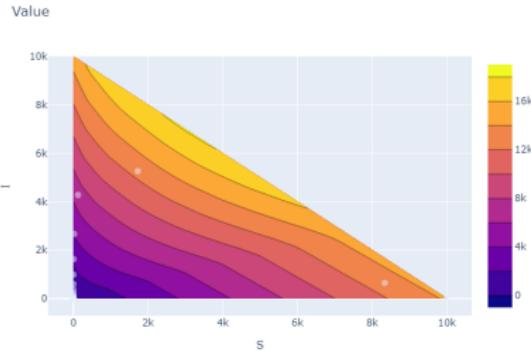


-17023.41: SIR model with control



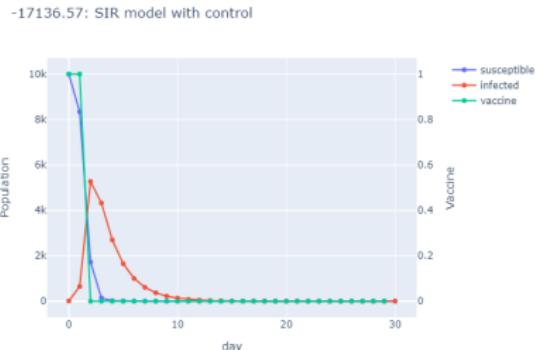
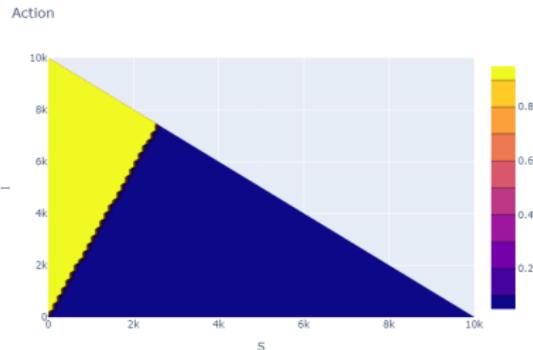
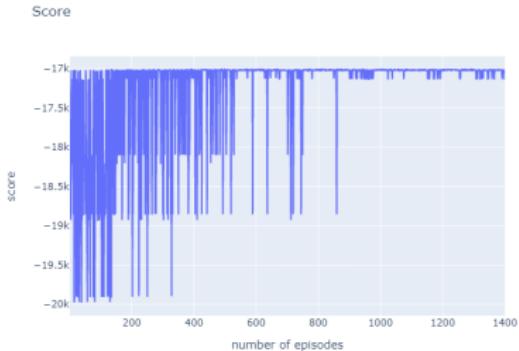
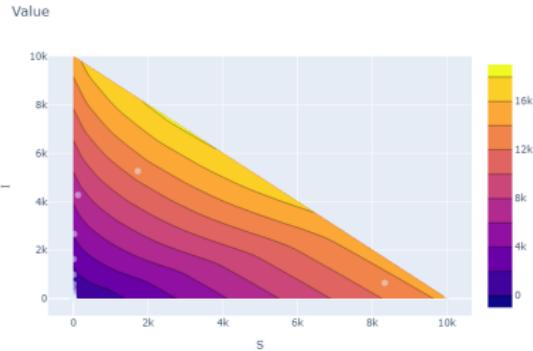
Case 1_ nu=0.1, beta=0.0005

After 1300 episodes learning:



Case 1_ nu=0.1, beta=0.0005

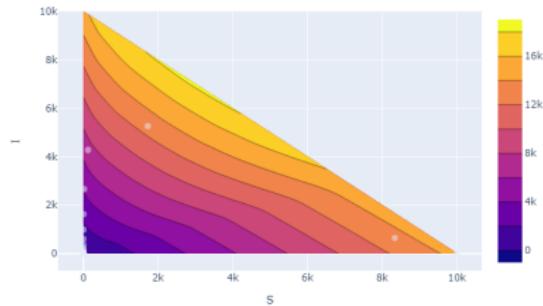
After 1400 episodes learning:



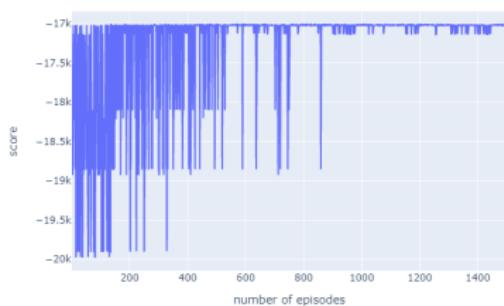
Case 1_ nu=0.1, beta=0.0005

After 1500 episodes learning:

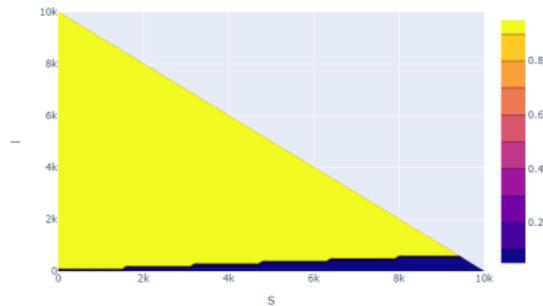
Value



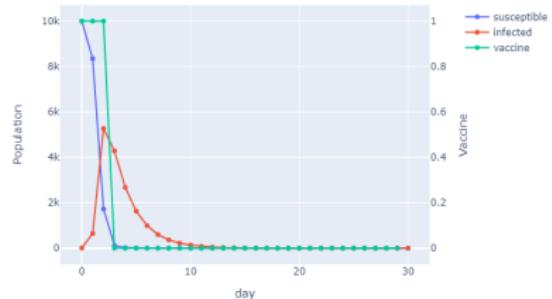
Score



Action



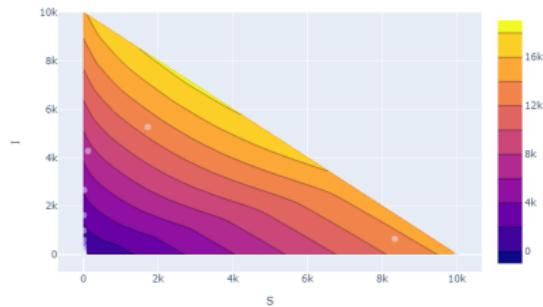
-17023.41: SIR model with control



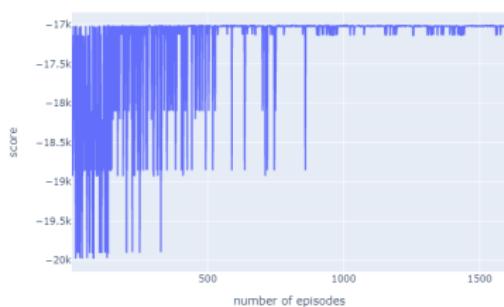
Case 1_ nu=0.1, beta=0.0005

After 1600 episodes learning:

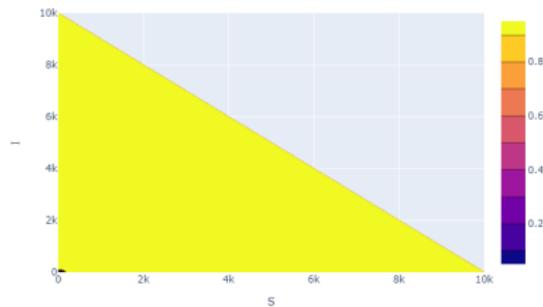
Value



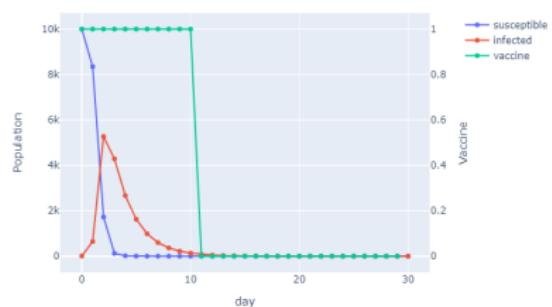
Score



Action



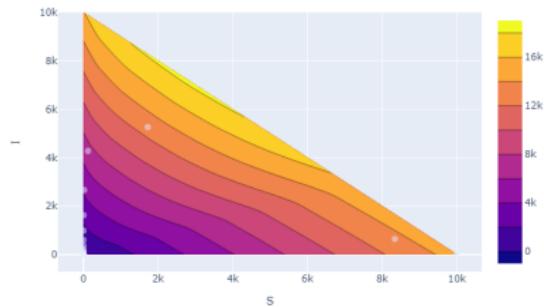
-17017.83: SIR model with control



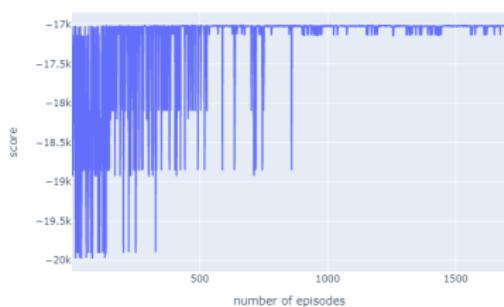
Case 1_ nu=0.1, beta=0.0005

After 1700 episodes learning:

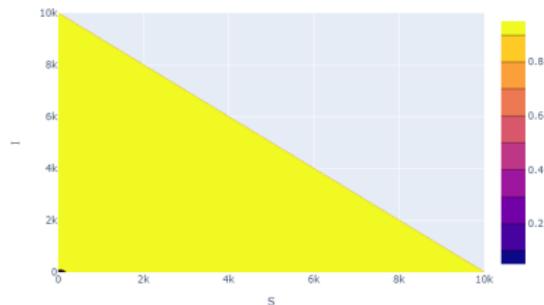
Value



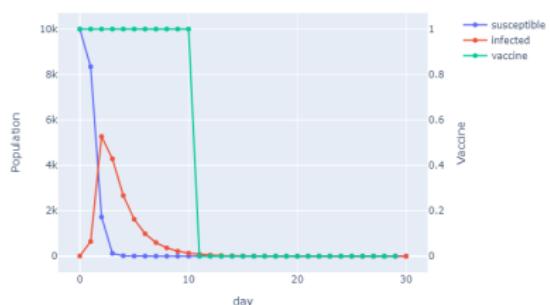
Score



Action

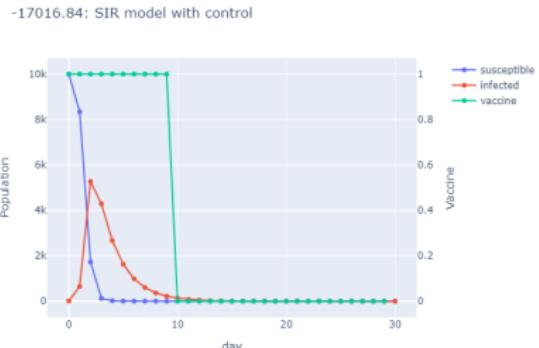
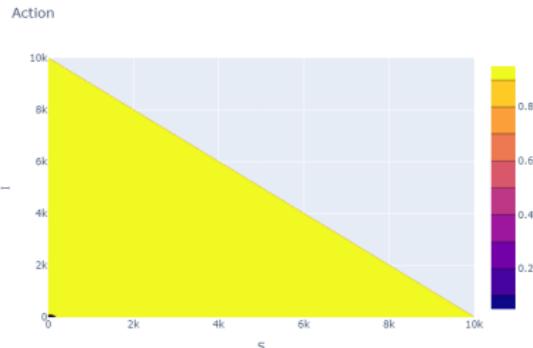
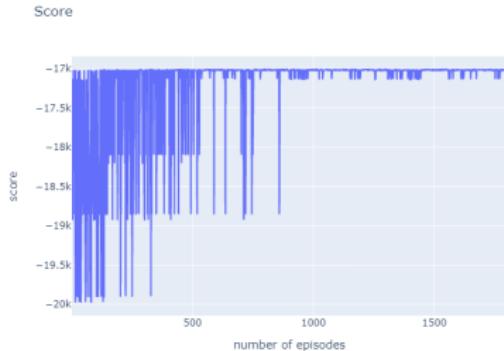
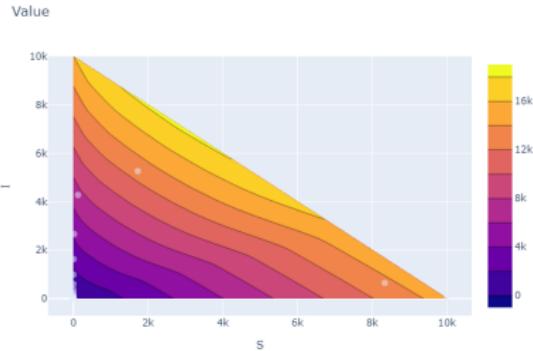


-17017.83: SIR model with control



Case 1_ nu=0.1, beta=0.0005

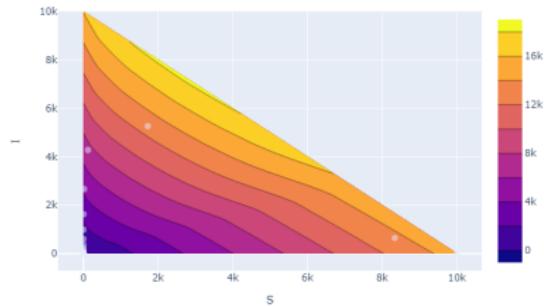
After 1800 episodes learning:



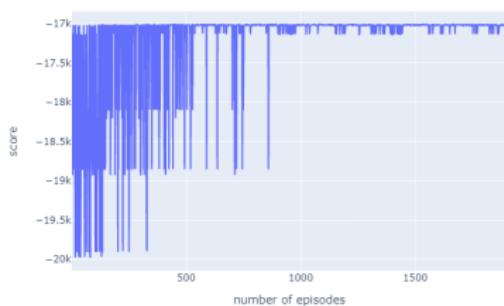
Case 1_ nu=0.1, beta=0.0005

After 1900 episodes learning:

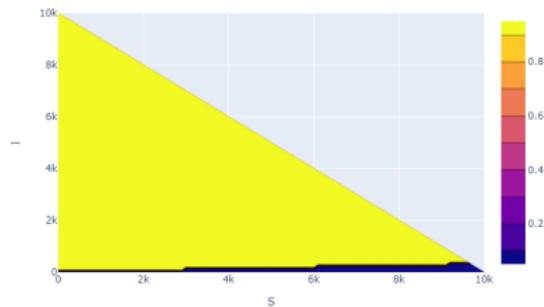
Value



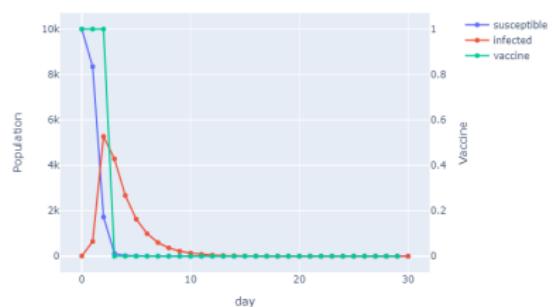
Score



Action

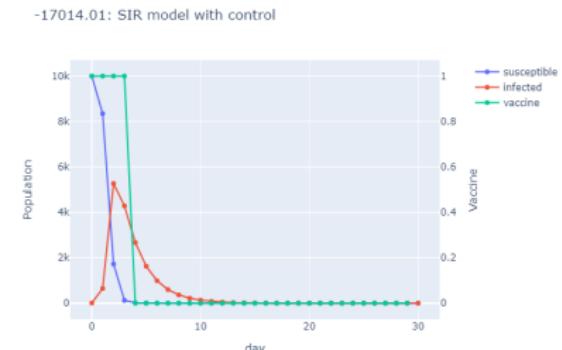
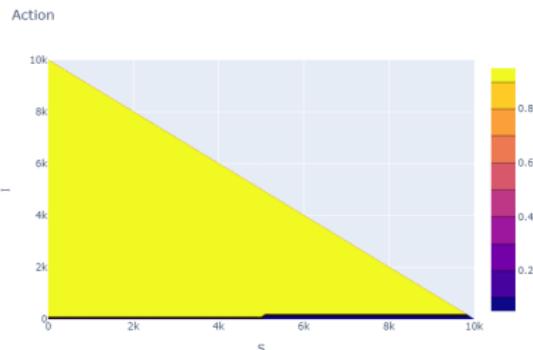
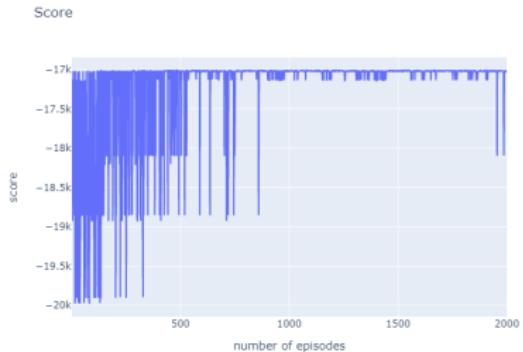
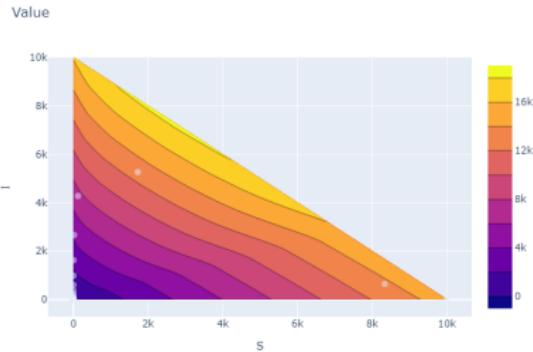


-17023.41: SIR model with control



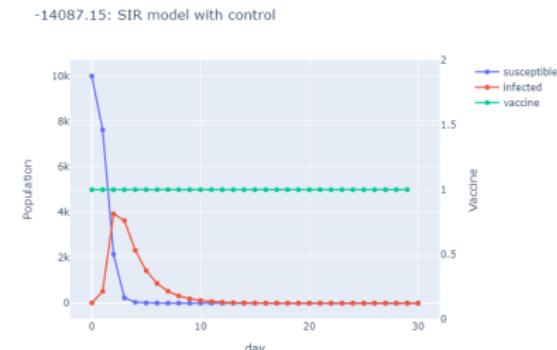
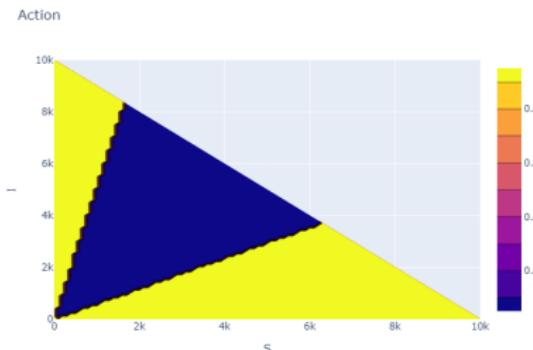
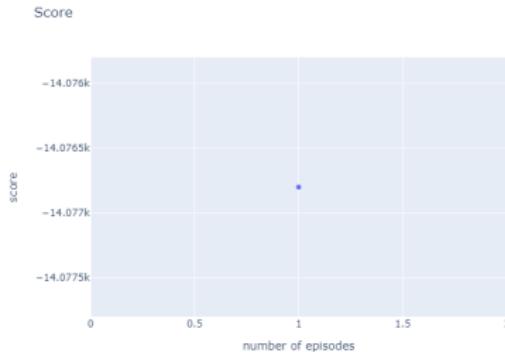
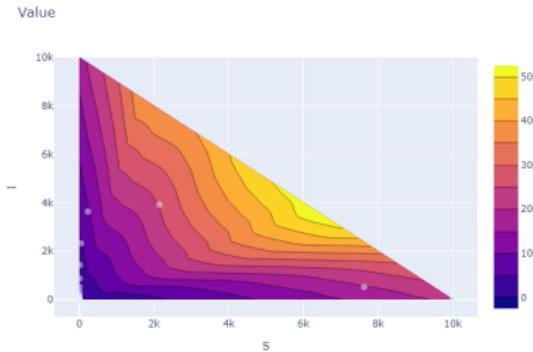
Case 1_ nu=0.1, beta=0.0005

After 2000 episodes learning:



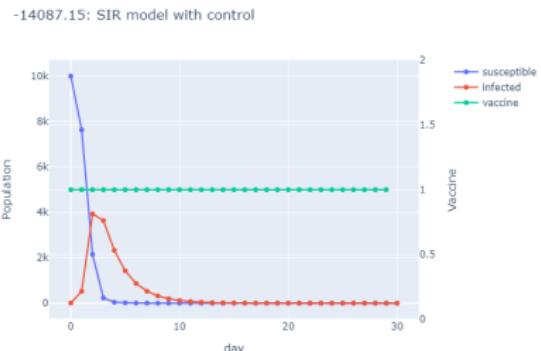
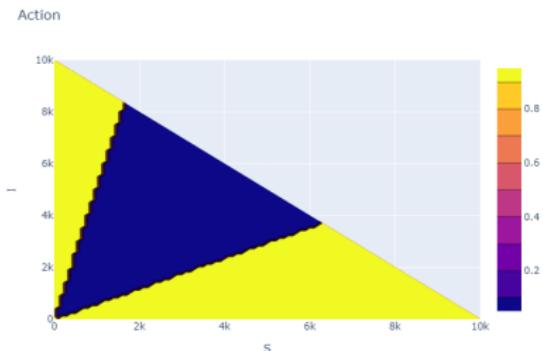
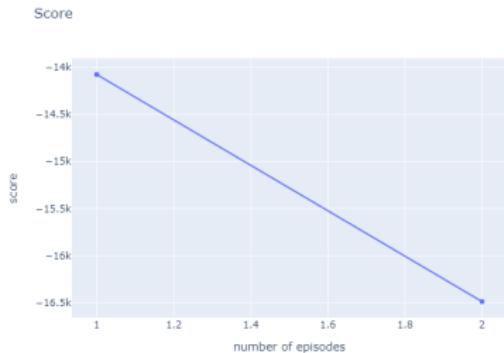
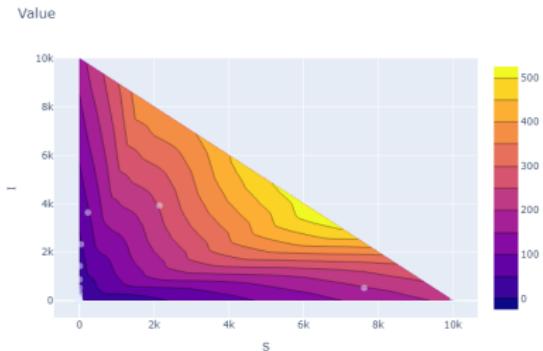
Case 2_ nu=0.2, beta=0.0005

After 1 episodes learning:



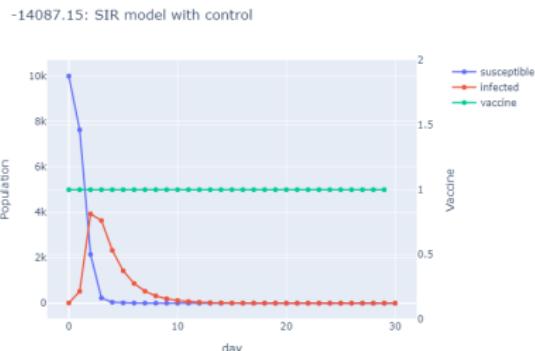
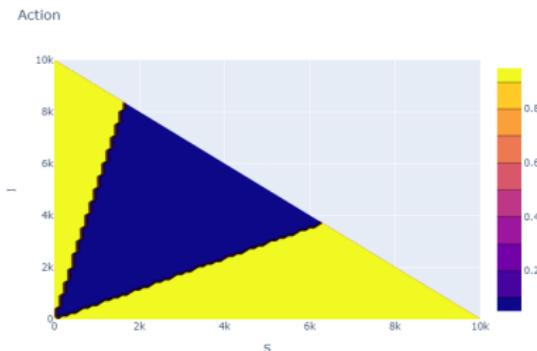
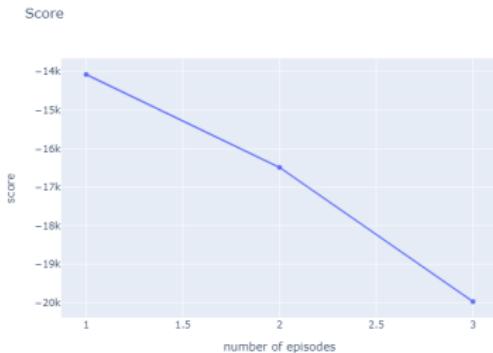
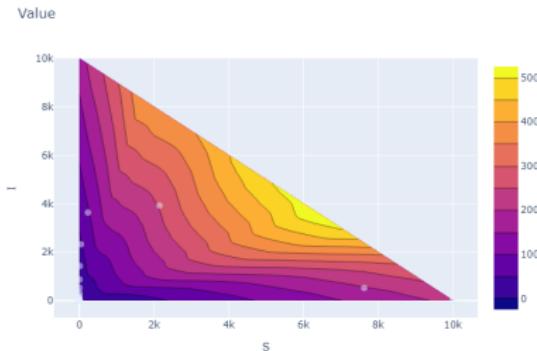
Case 2_ nu=0.2, beta=0.0005

After 2 episodes learning:



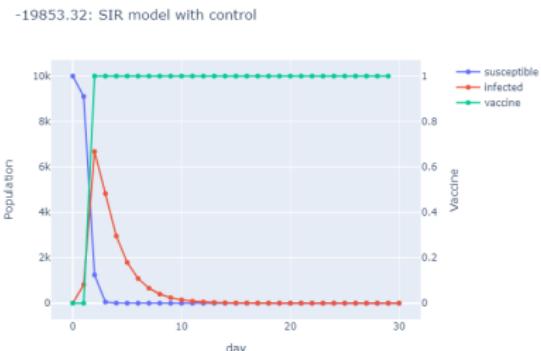
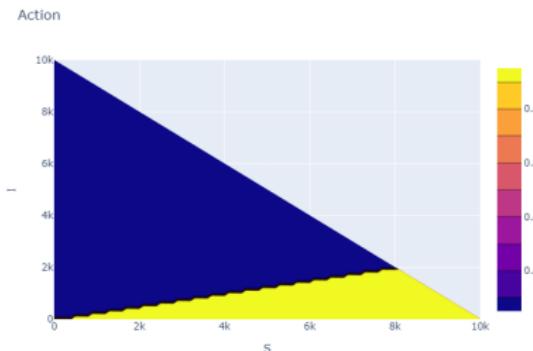
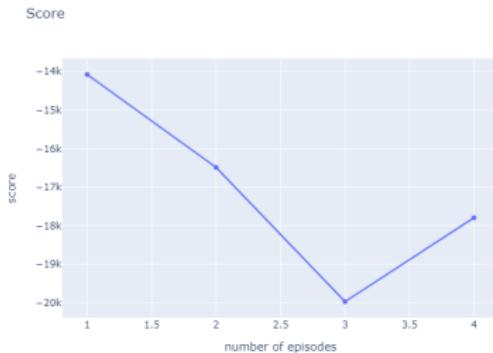
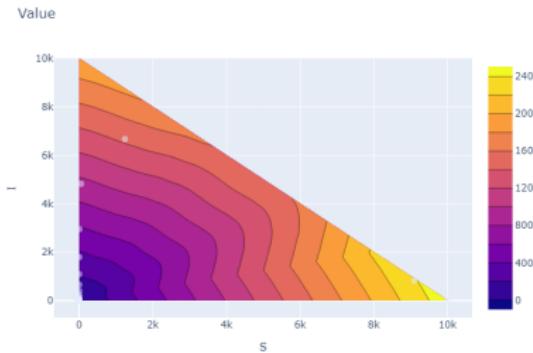
Case 2_ nu=0.2, beta=0.0005

After 3 episodes learning:



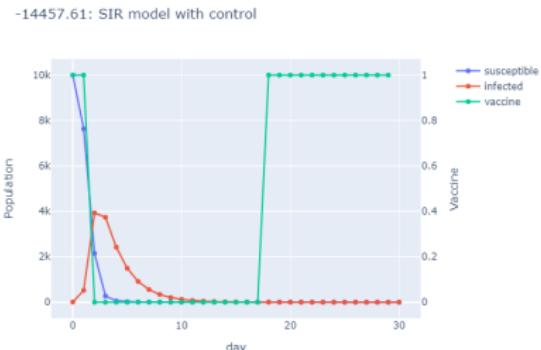
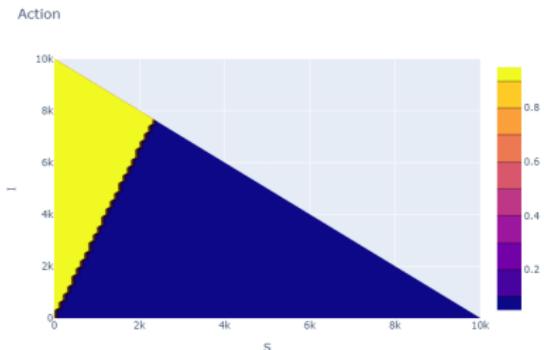
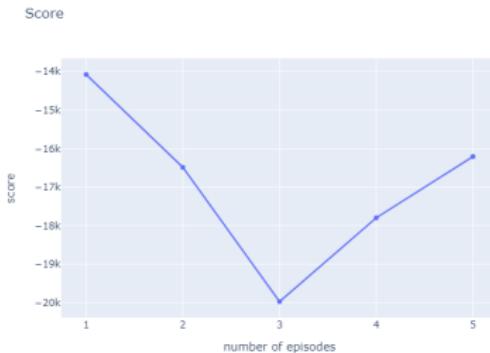
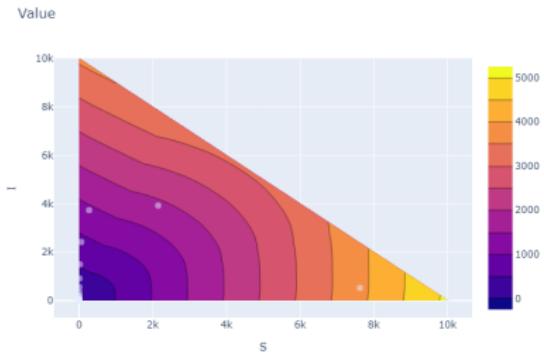
Case 2_ nu=0.2, beta=0.0005

After 4 episodes learning:



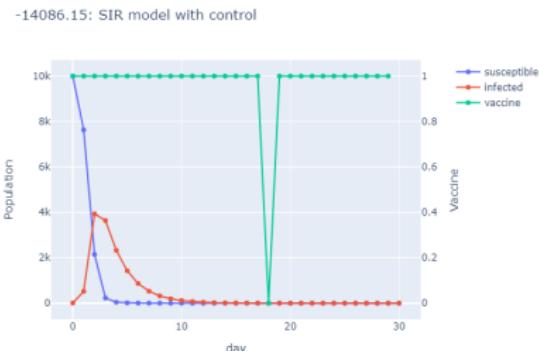
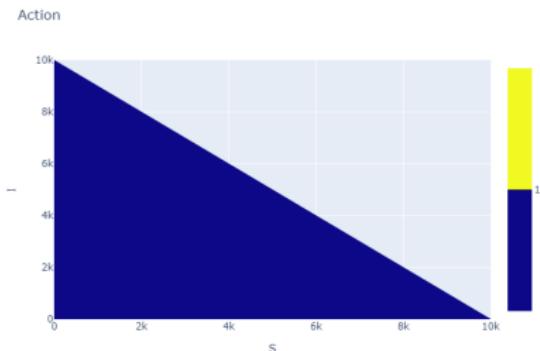
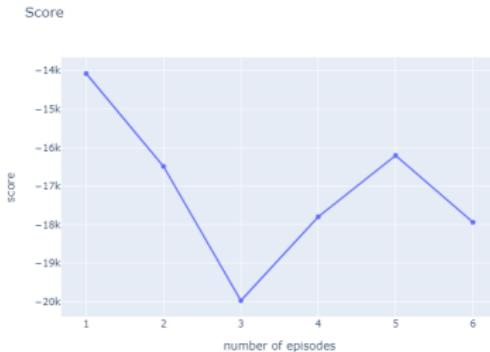
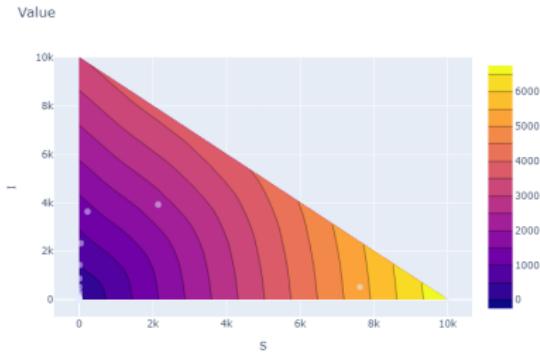
Case 2_ nu=0.2, beta=0.0005

After 5 episodes learning:



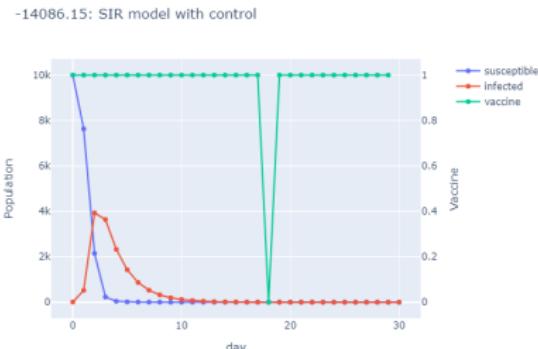
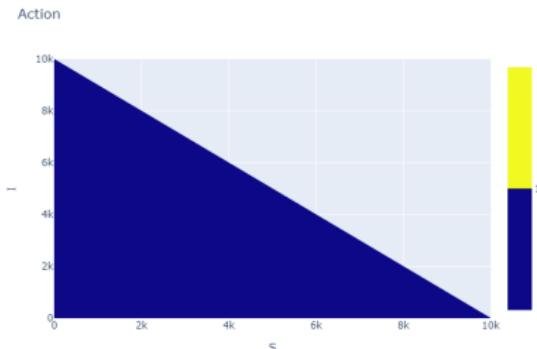
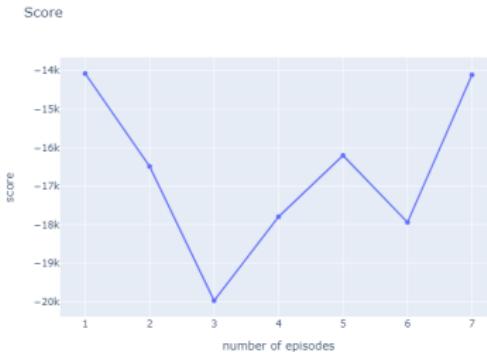
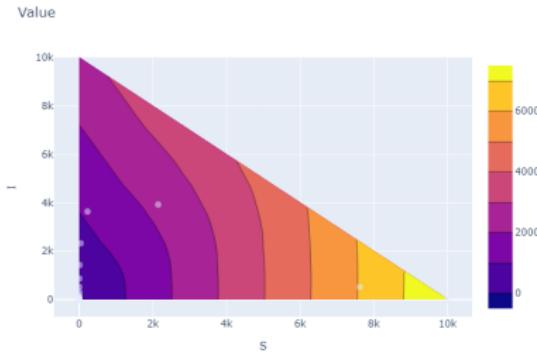
Case 2_ nu=0.2, beta=0.0005

After 6 episodes learning:



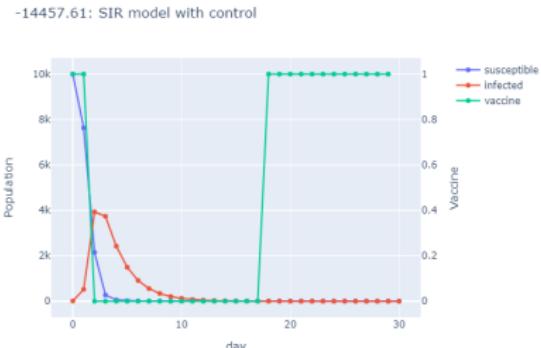
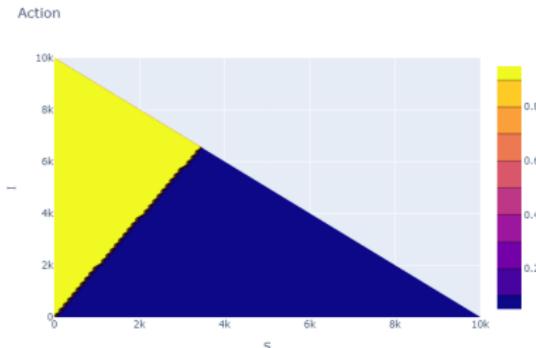
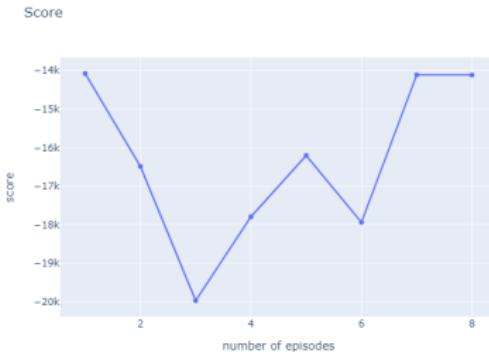
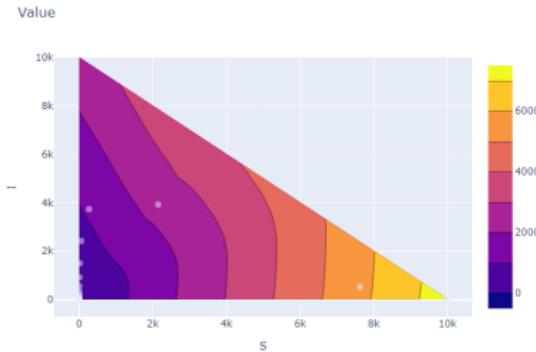
Case 2_ nu=0.2, beta=0.0005

After 7 episodes learning:



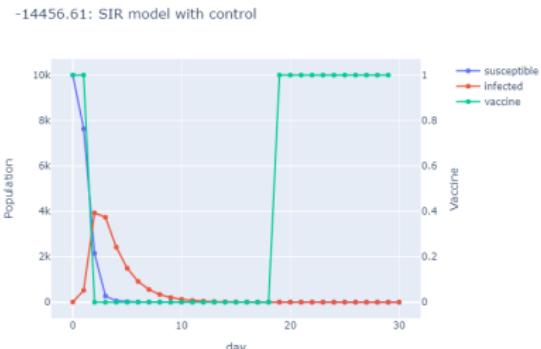
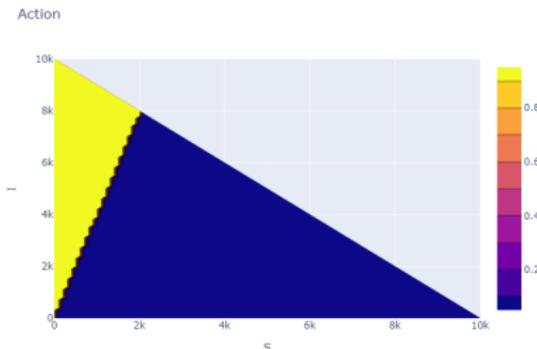
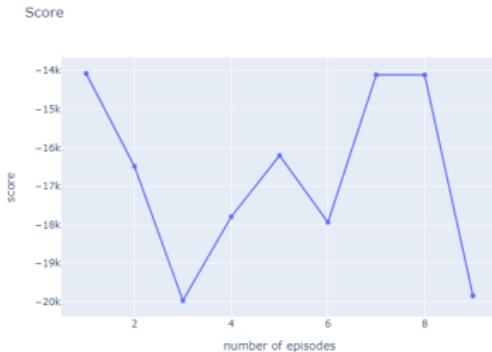
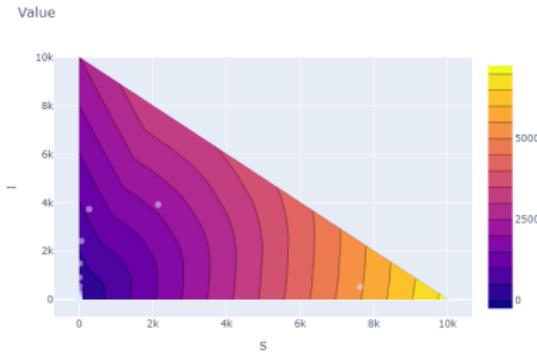
Case 2_ nu=0.2, beta=0.0005

After 8 episodes learning:



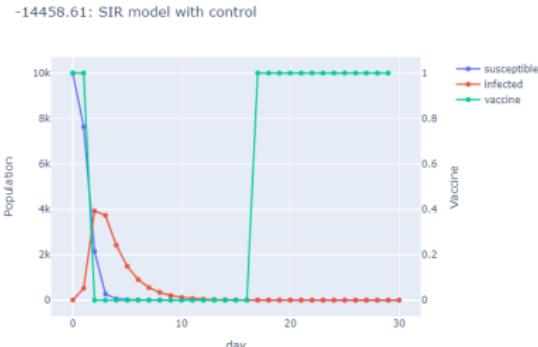
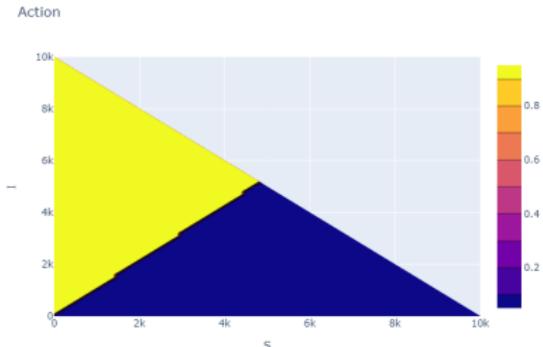
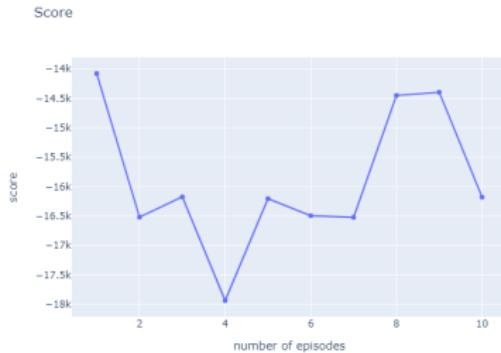
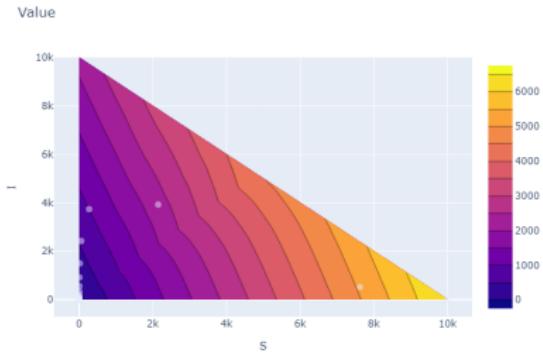
Case 2_ nu=0.2, beta=0.0005

After 9 episodes learning:



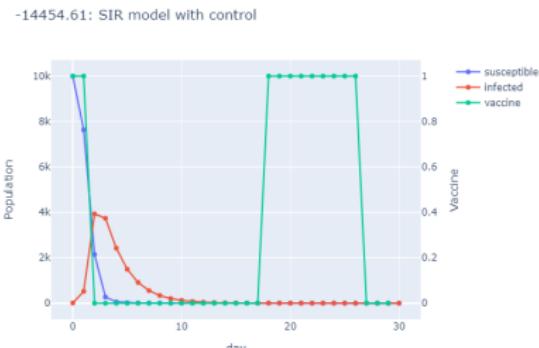
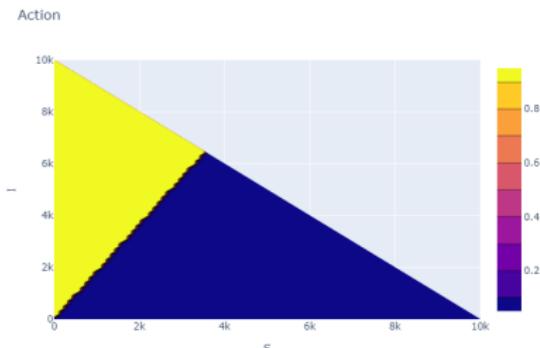
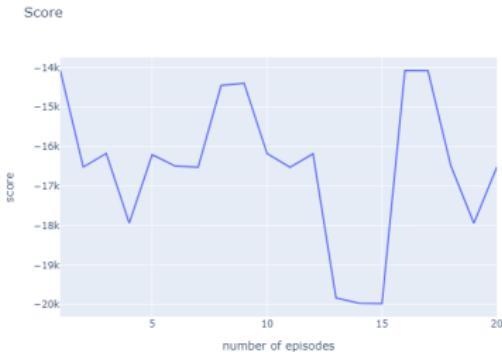
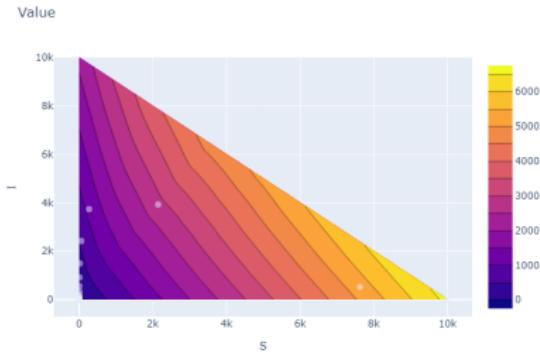
Case 2_ nu=0.2, beta=0.0005

After 10 episodes learning:



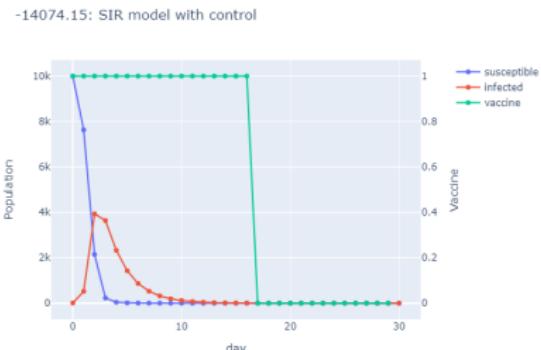
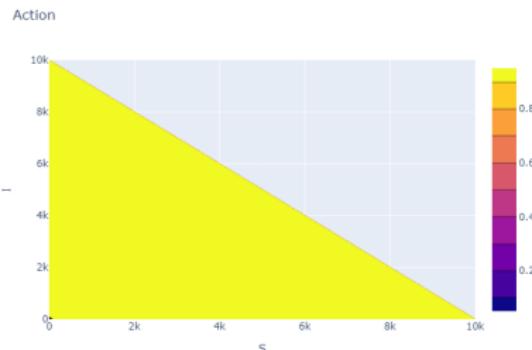
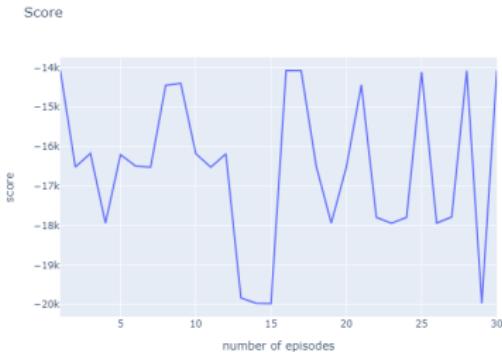
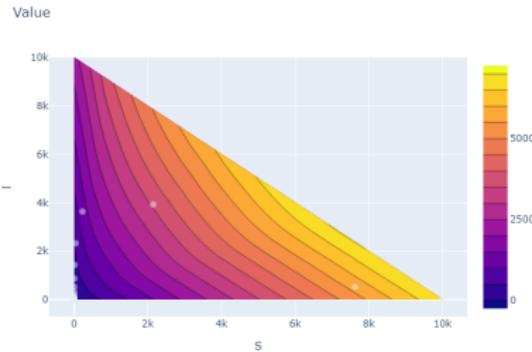
Case 2_ nu=0.2, beta=0.0005

After 20 episodes learning:



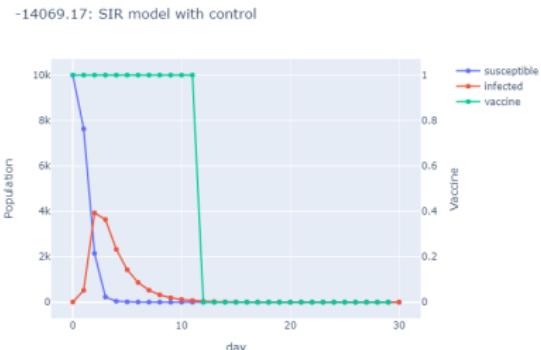
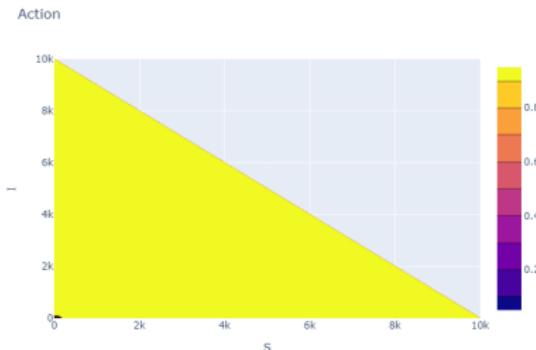
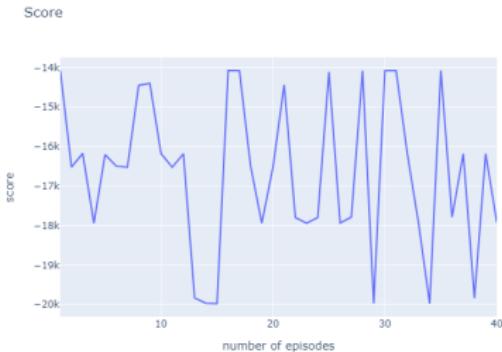
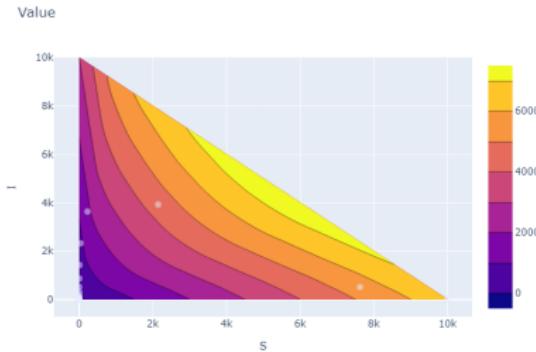
Case 2_ nu=0.2, beta=0.0005

After 30 episodes learning:



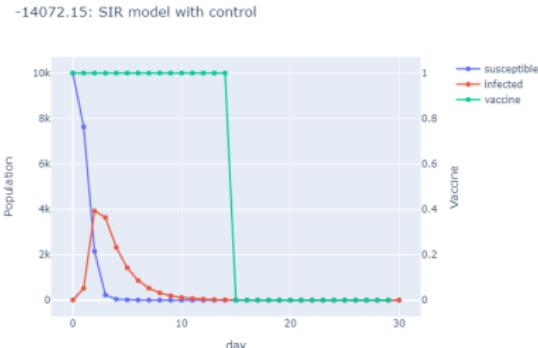
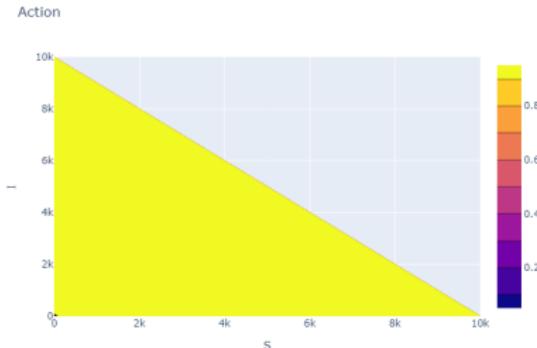
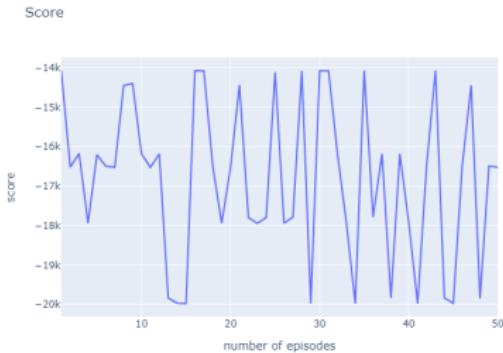
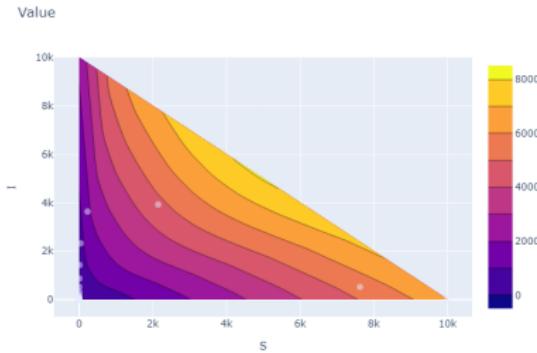
Case 2_ nu=0.2, beta=0.0005

After 40 episodes learning:



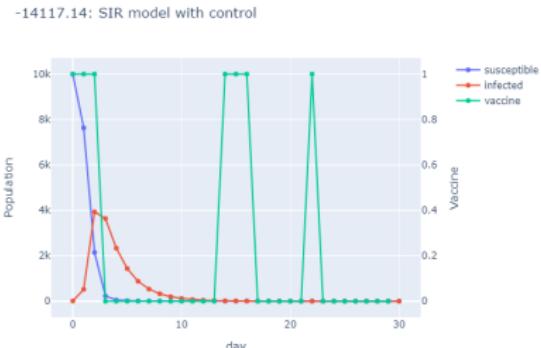
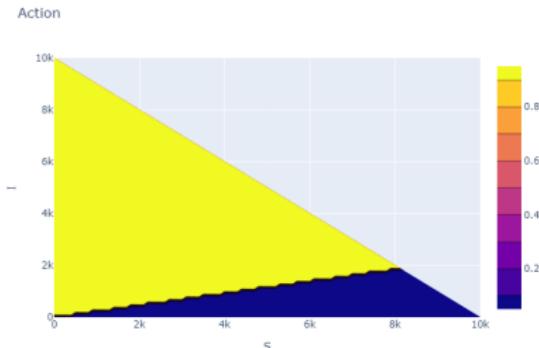
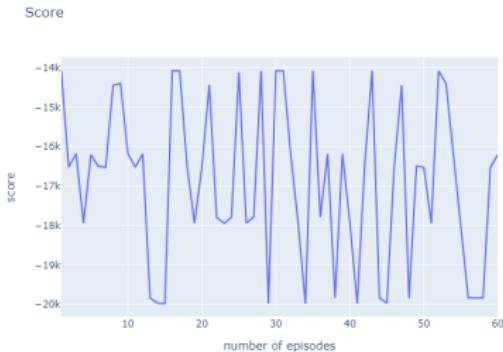
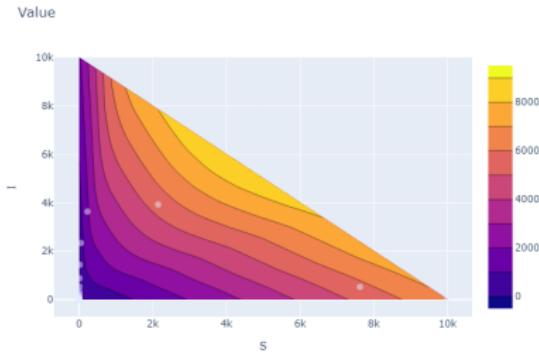
Case 2_ nu=0.2, beta=0.0005

After 50 episodes learning:



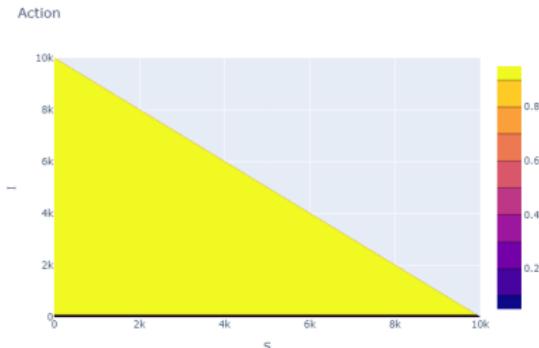
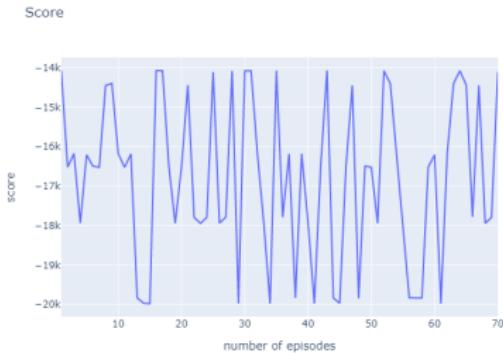
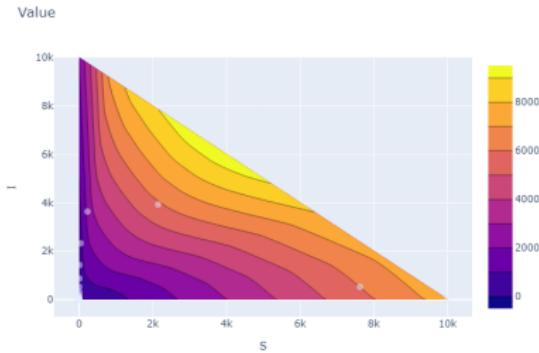
Case 2_ nu=0.2, beta=0.0005

After 60 episodes learning:



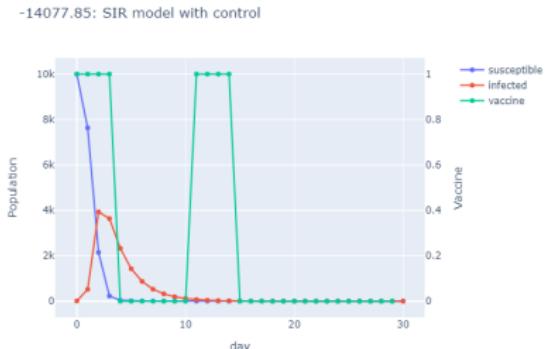
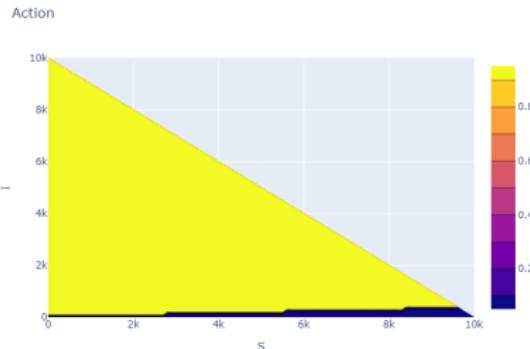
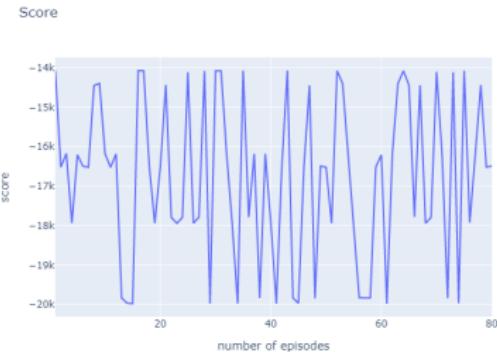
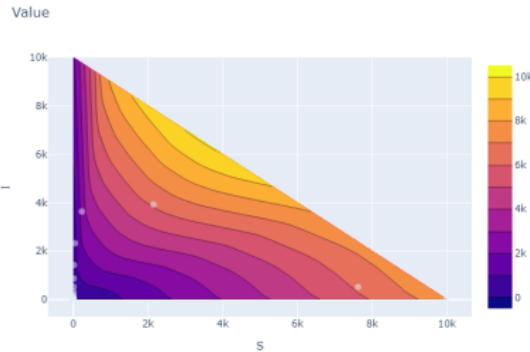
Case 2_ nu=0.2, beta=0.0005

After 70 episodes learning:



Case 2_ nu=0.2, beta=0.0005

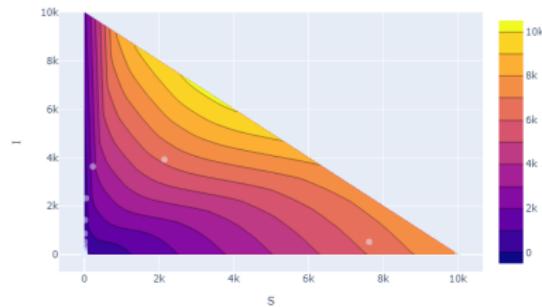
After 80 episodes learning:



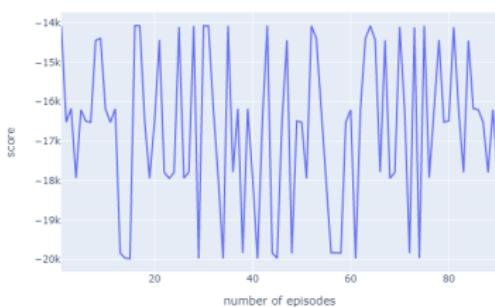
Case 2_ nu=0.2, beta=0.0005

After 90 episodes learning:

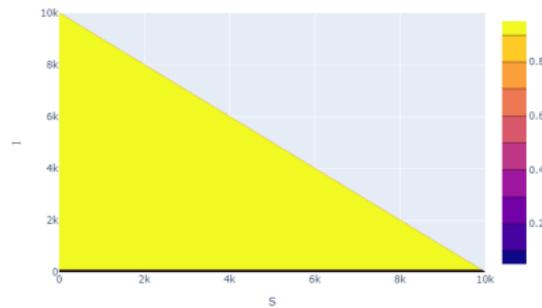
Value



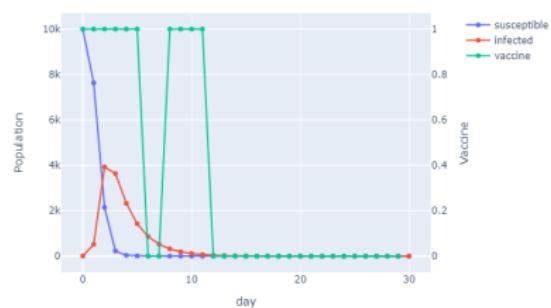
Score



Action

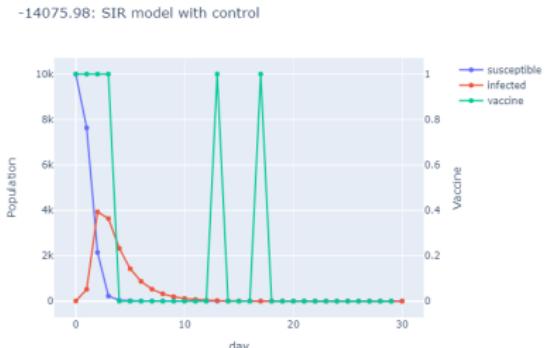
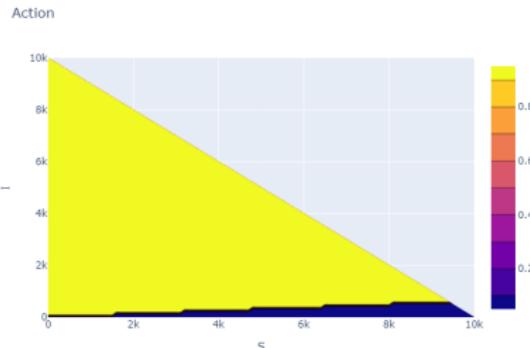
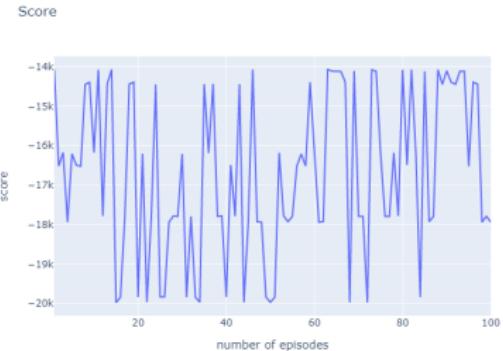
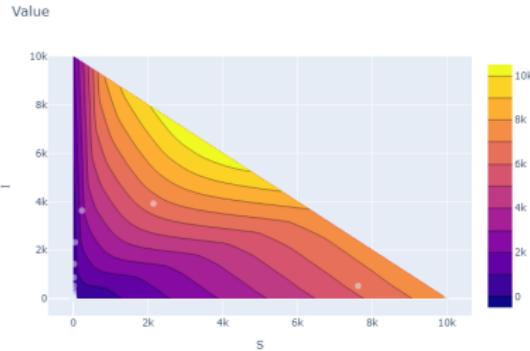


-14068.42: SIR model with control



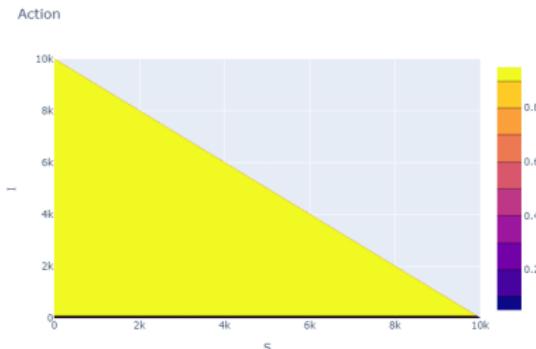
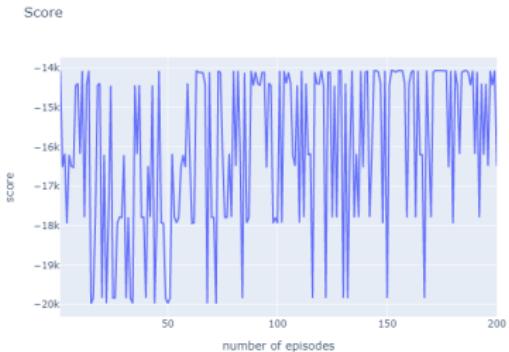
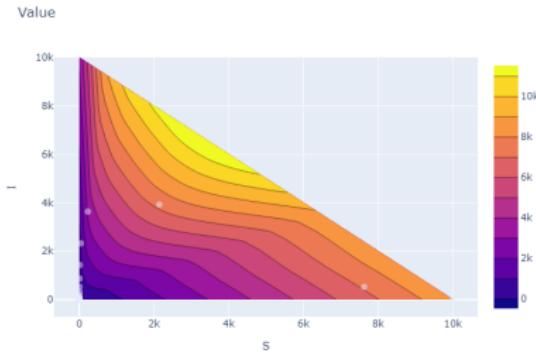
Case 2_ nu=0.2, beta=0.0005

After 100 episodes learning:



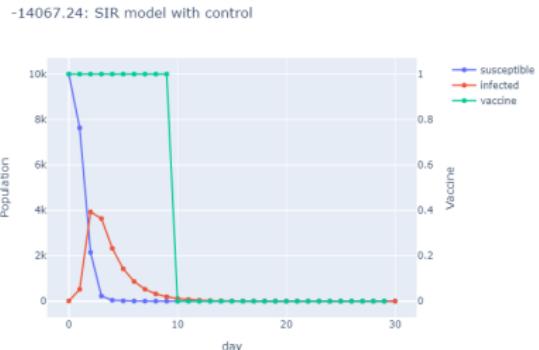
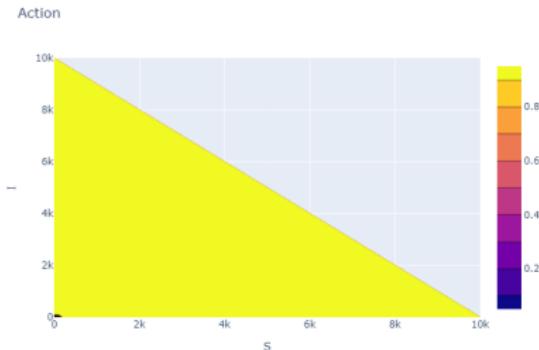
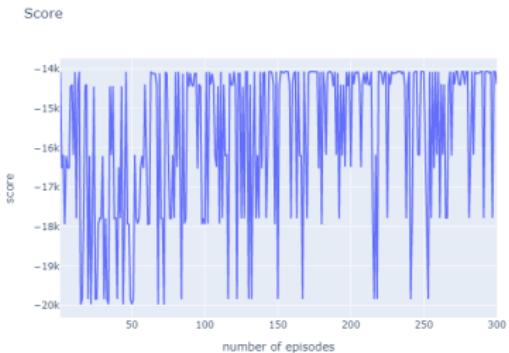
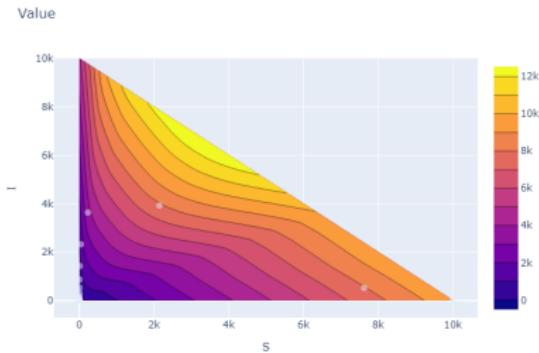
Case 2_ nu=0.2, beta=0.0005

After 200 episodes learning:



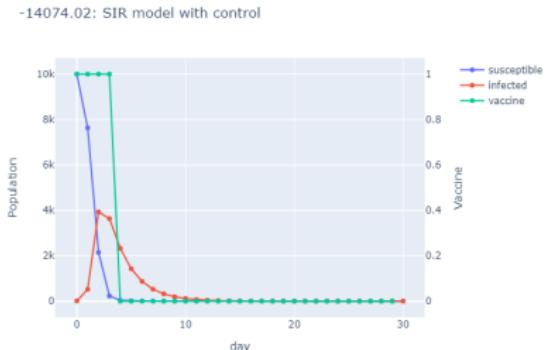
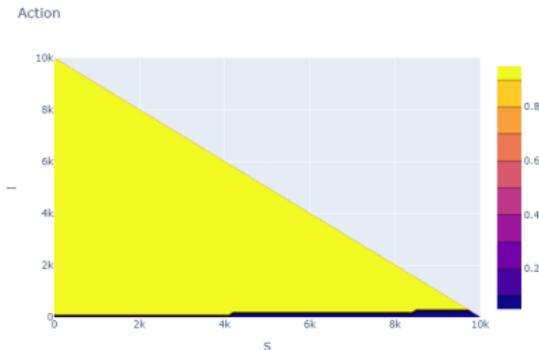
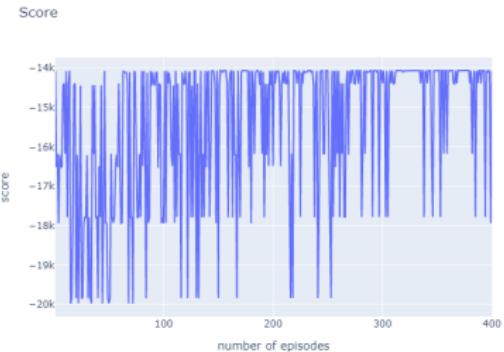
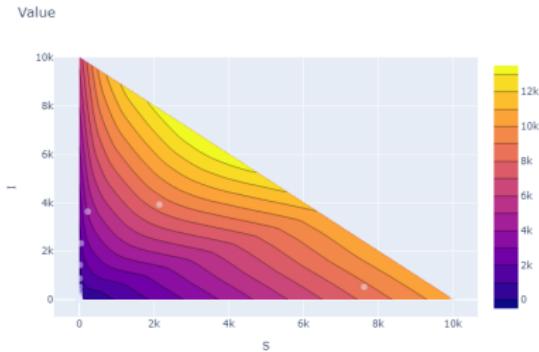
Case 2_ nu=0.2, beta=0.0005

After 300 episodes learning:



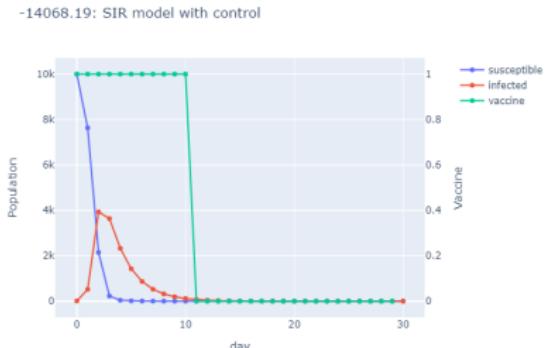
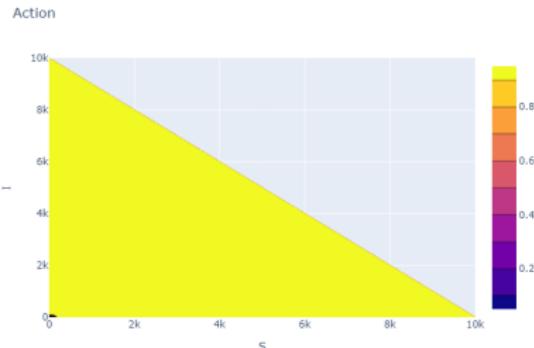
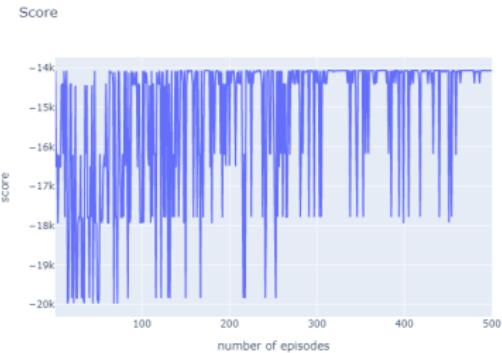
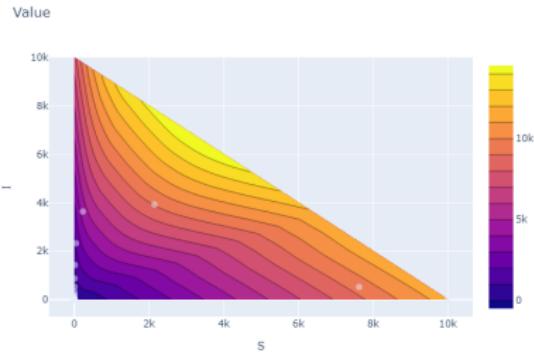
Case 2_ nu=0.2, beta=0.0005

After 400 episodes learning:



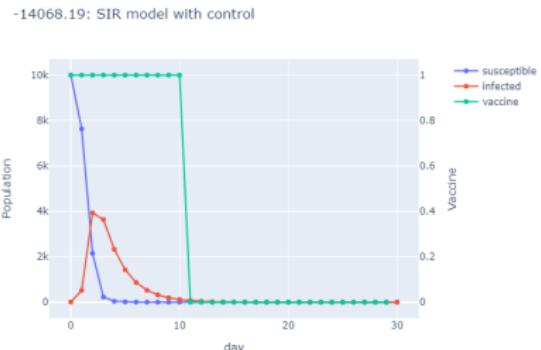
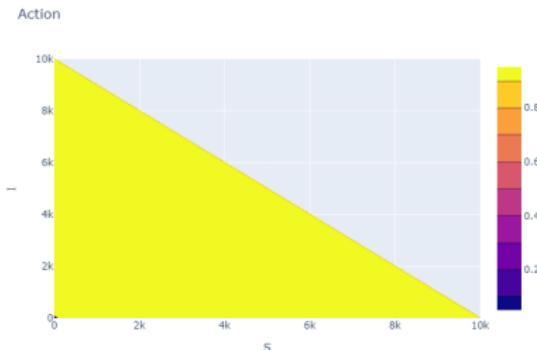
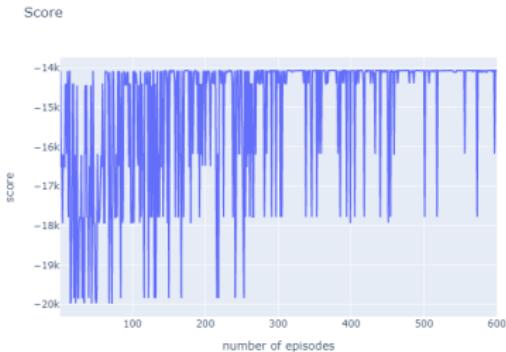
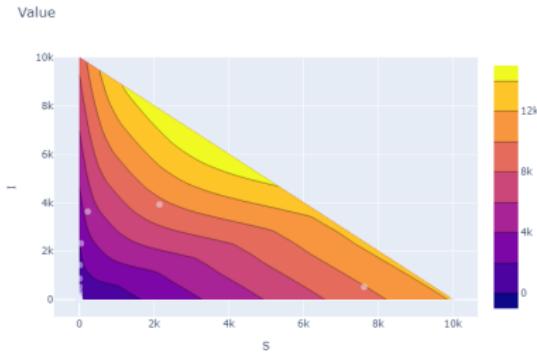
Case 2_ nu=0.2, beta=0.0005

After 500 episodes learning:



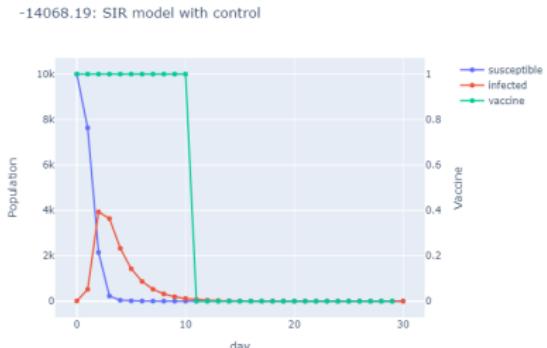
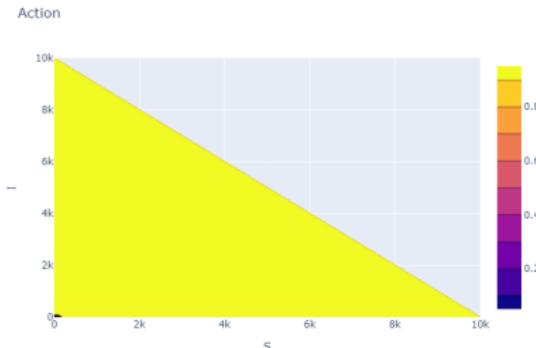
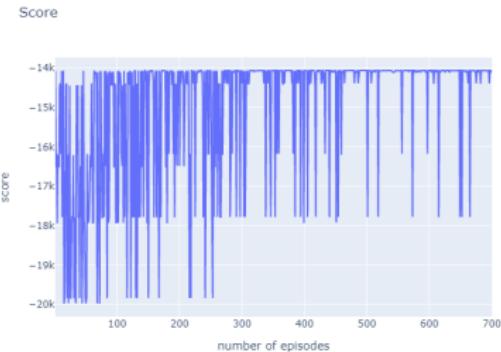
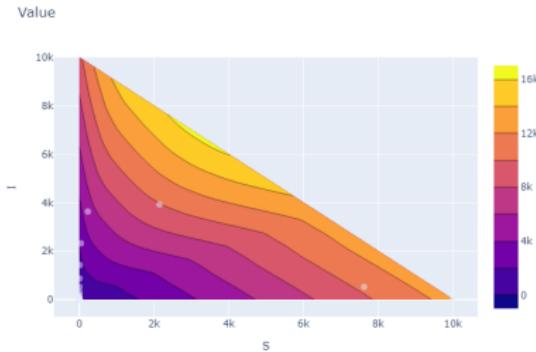
Case 2_ nu=0.2, beta=0.0005

After 600 episodes learning:



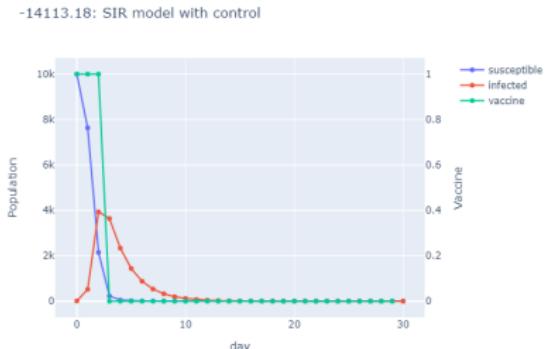
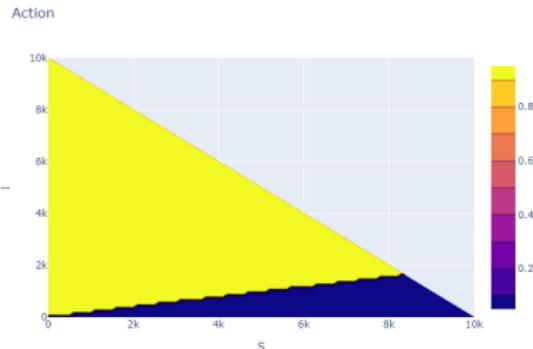
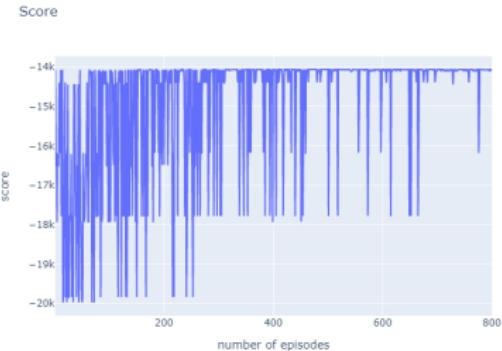
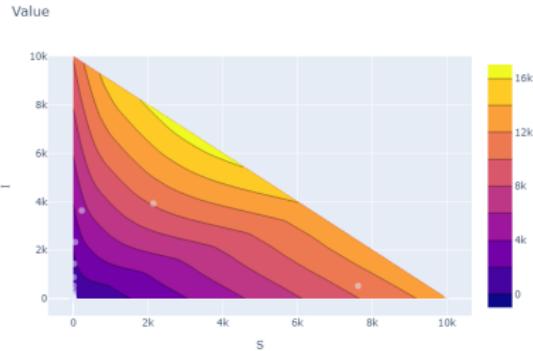
Case 2_ nu=0.2, beta=0.0005

After 700 episodes learning:



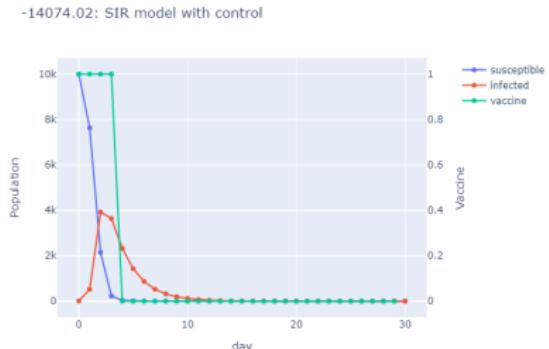
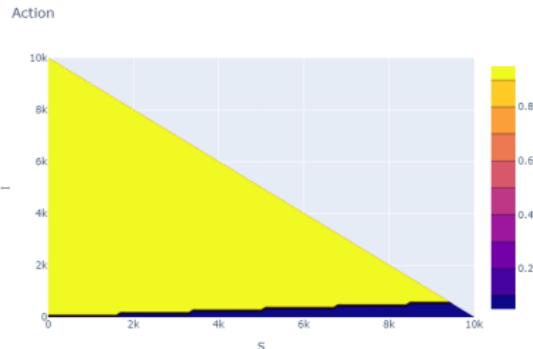
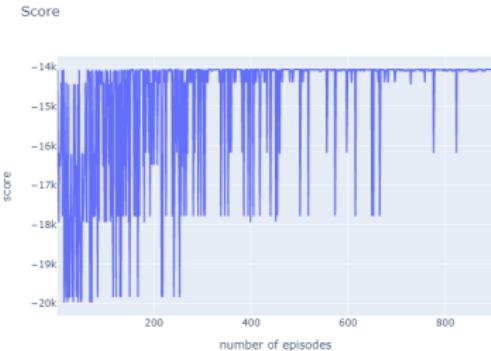
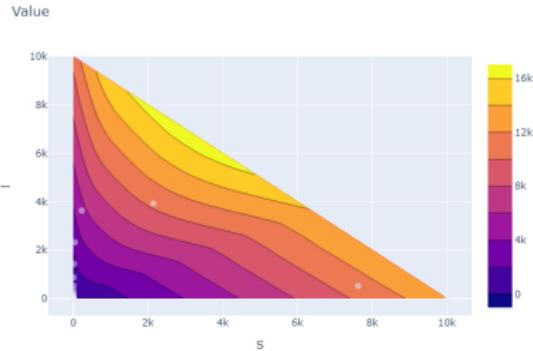
Case 2_ nu=0.2, beta=0.0005

After 800 episodes learning:



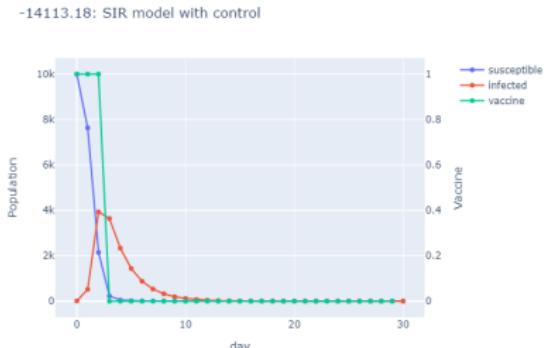
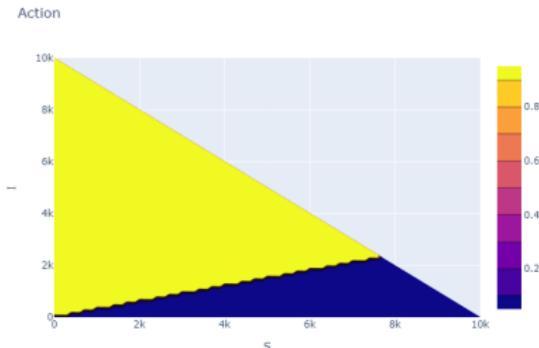
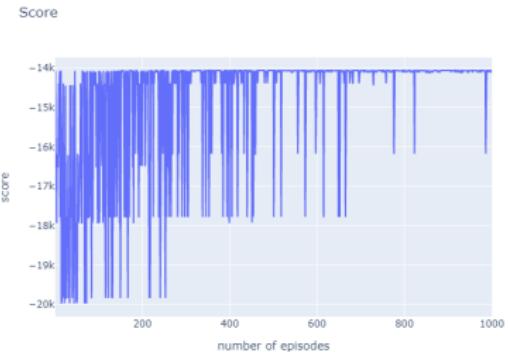
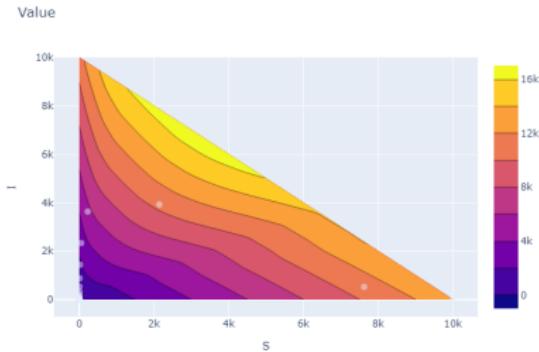
Case 2_ nu=0.2, beta=0.0005

After 900 episodes learning:



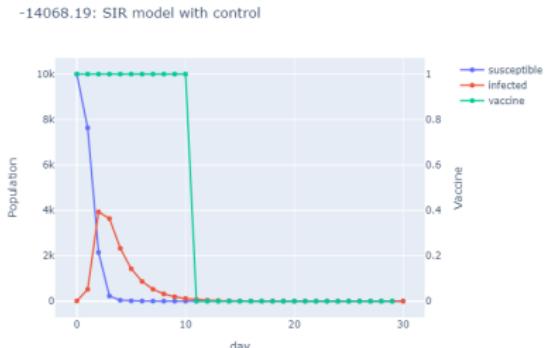
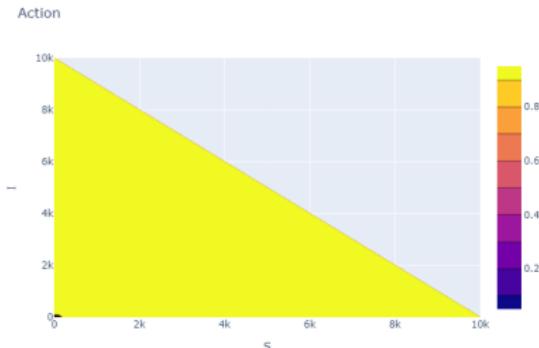
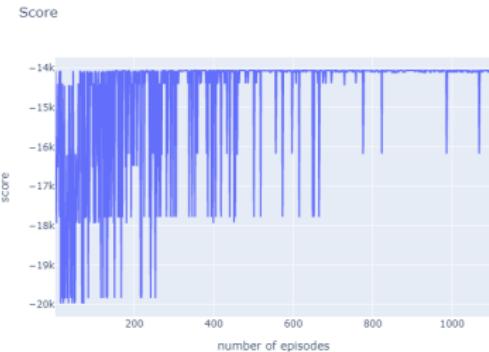
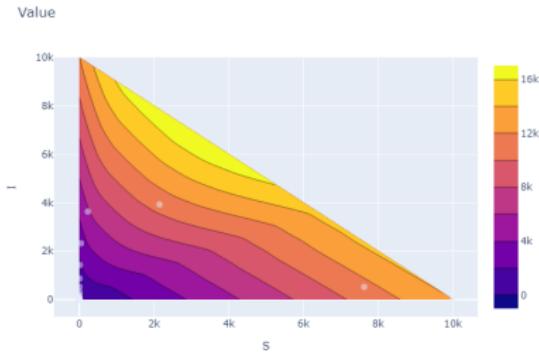
Case 2_ nu=0.2, beta=0.0005

After 1000 episodes learning:



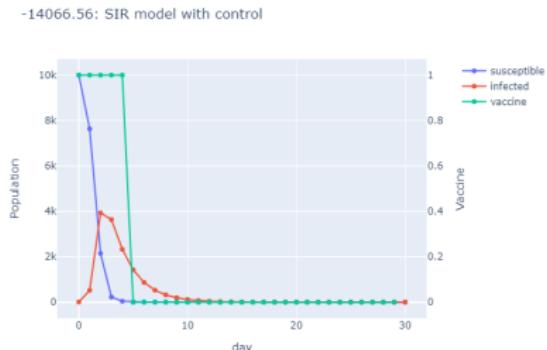
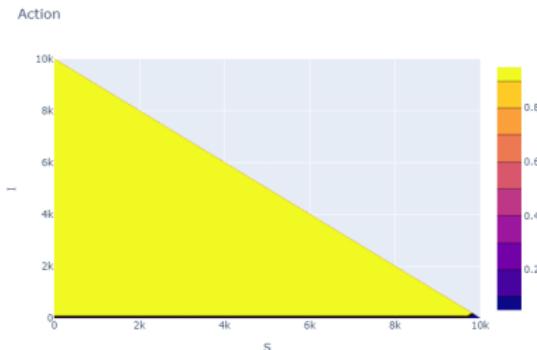
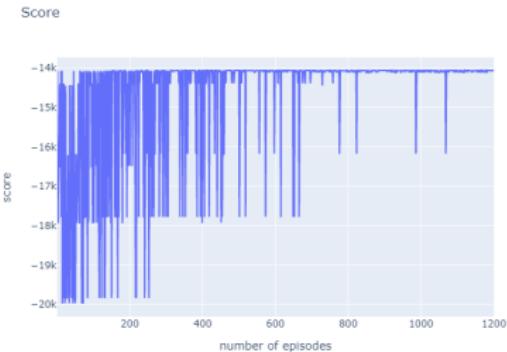
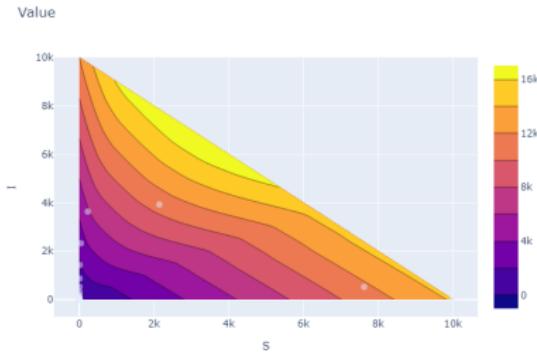
Case 2_ nu=0.2, beta=0.0005

After 1100 episodes learning:



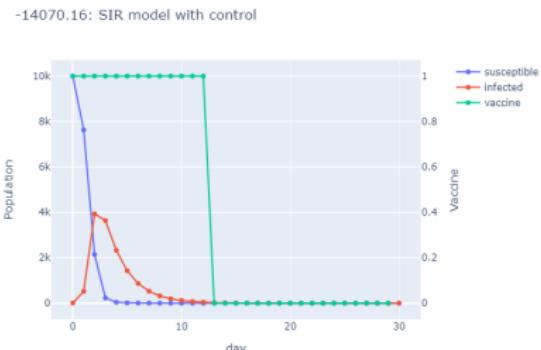
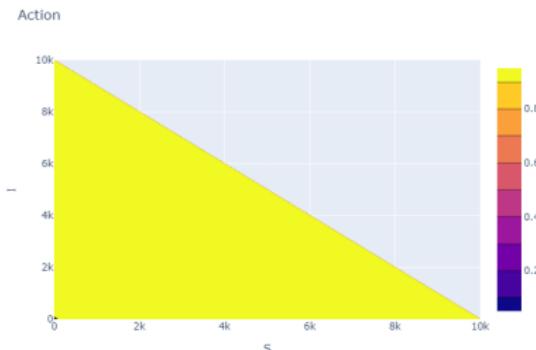
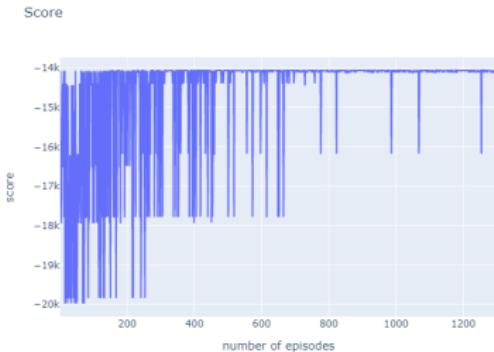
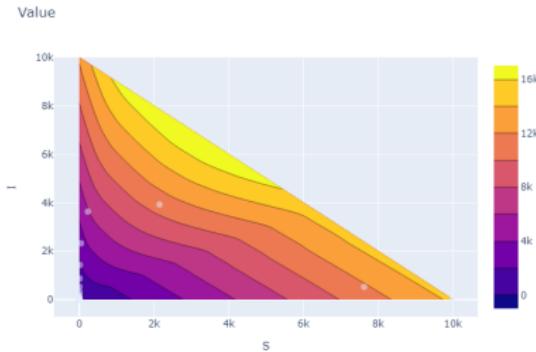
Case 2_ nu=0.2, beta=0.0005

After 1200 episodes learning:



Case 2_ nu=0.2, beta=0.0005

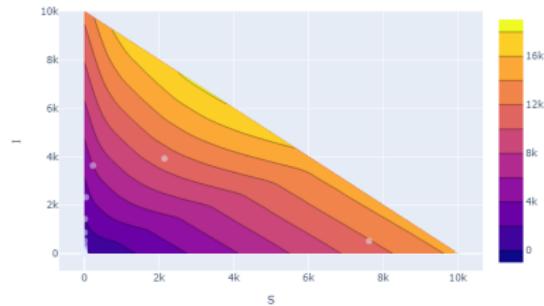
After 1300 episodes learning:



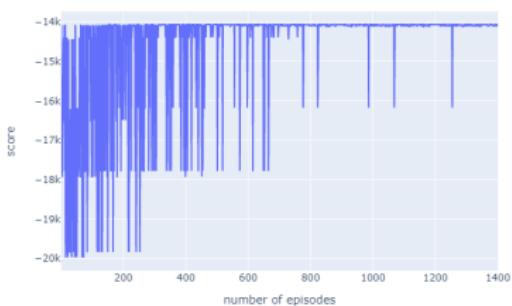
Case 2_ nu=0.2, beta=0.0005

After 1400 episodes learning:

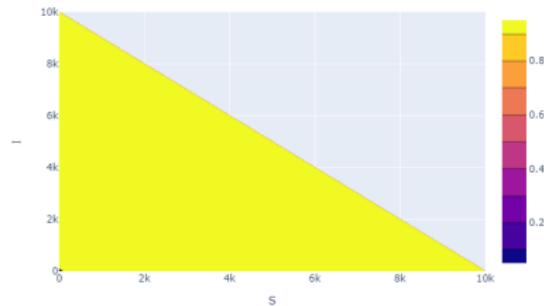
Value



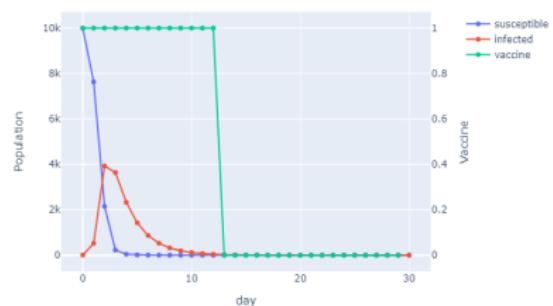
Score



Action

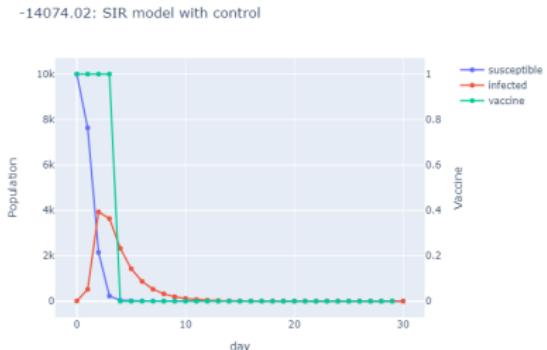
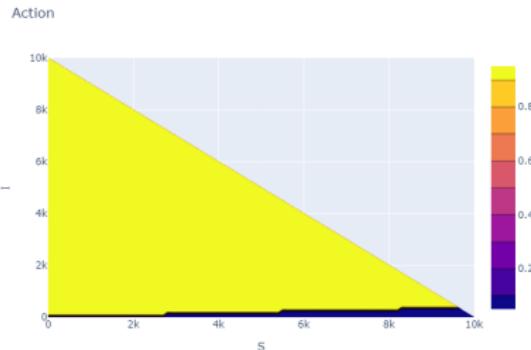
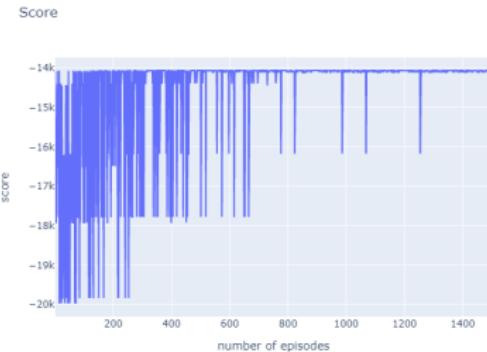
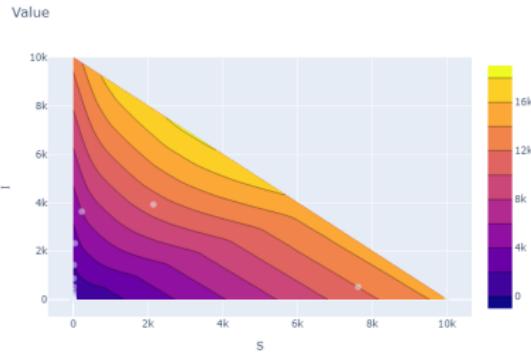


-14070.16: SIR model with control



Case 2_ nu=0.2, beta=0.0005

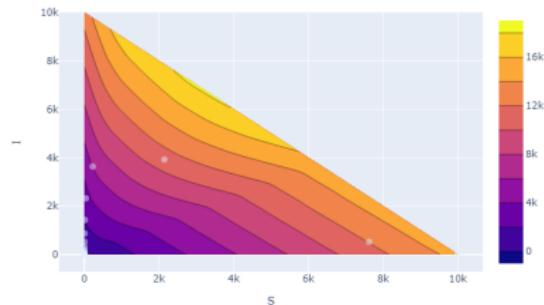
After 1500 episodes learning:



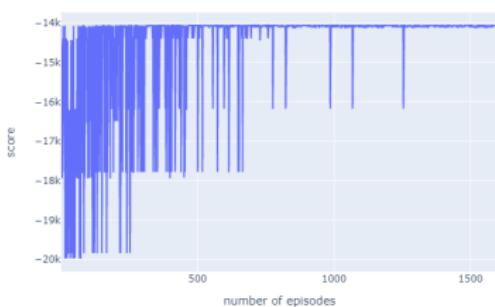
Case 2_ nu=0.2, beta=0.0005

After 1600 episodes learning:

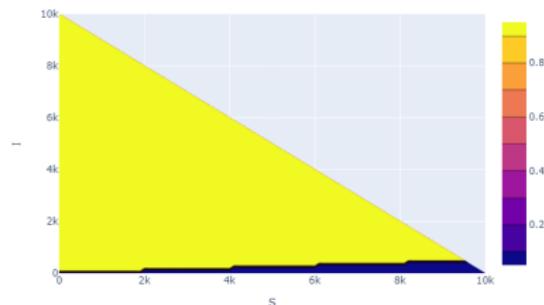
Value



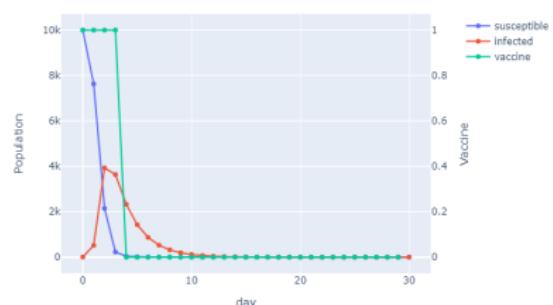
Score



Action



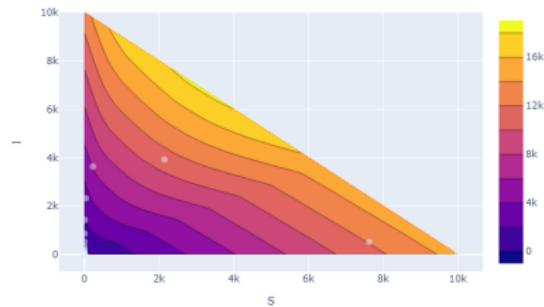
-14074.02: SIR model with control



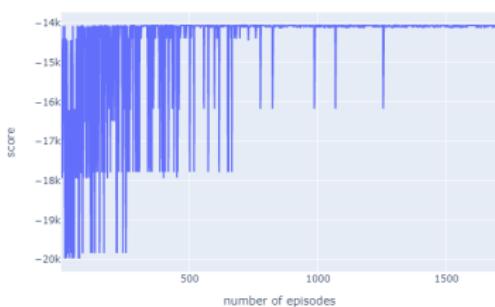
Case 2_ nu=0.2, beta=0.0005

After 1700 episodes learning:

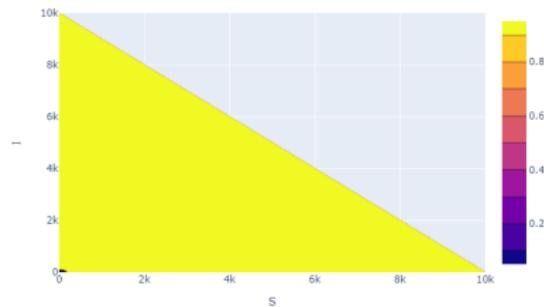
Value



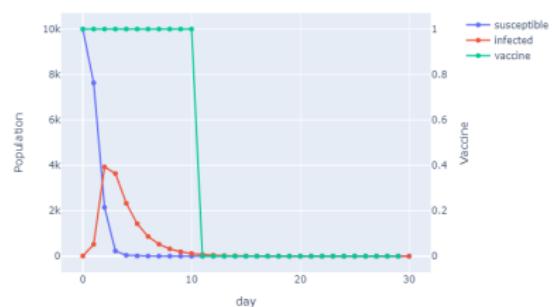
Score



Action



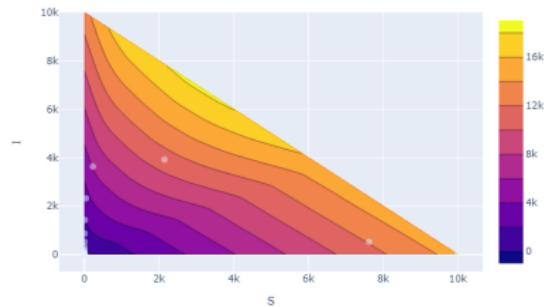
-14068.19: SIR model with control



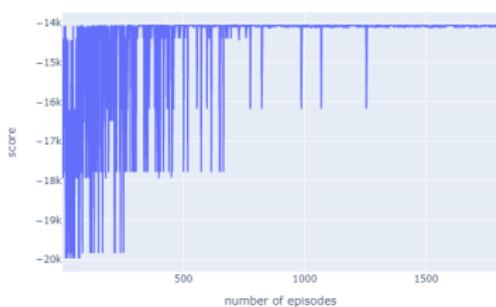
Case 2_ nu=0.2, beta=0.0005

After 1800 episodes learning:

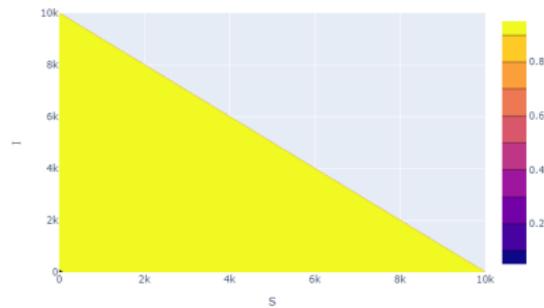
Value



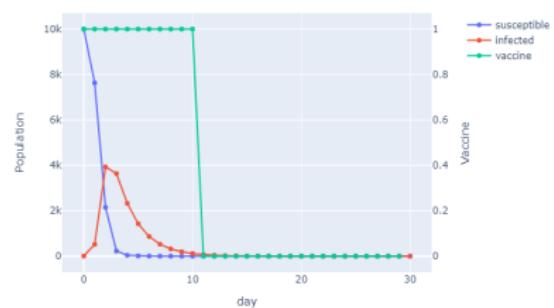
Score



Action



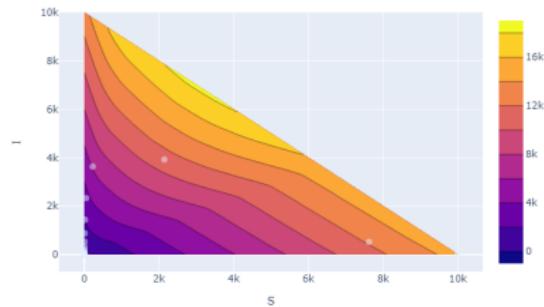
-14068.19: SIR model with control



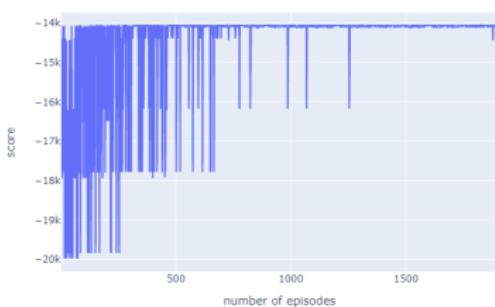
Case 2_ nu=0.2, beta=0.0005

After 1900 episodes learning:

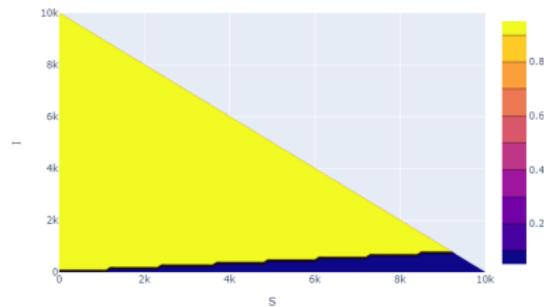
Value



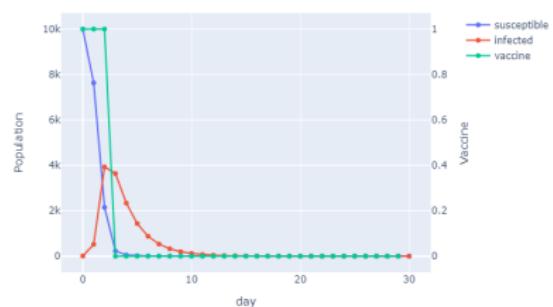
Score



Action



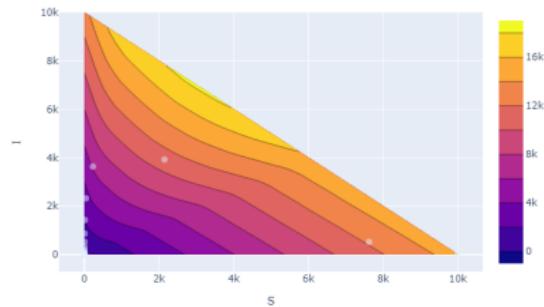
-14113.18: SIR model with control



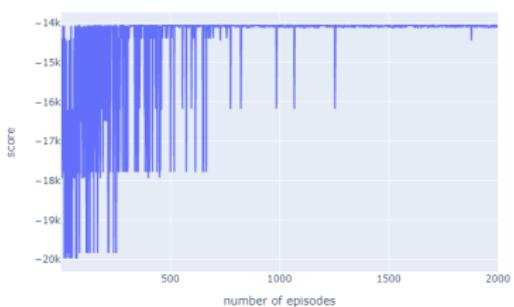
Case 2_ nu=0.2, beta=0.0005

After 2000 episodes learning:

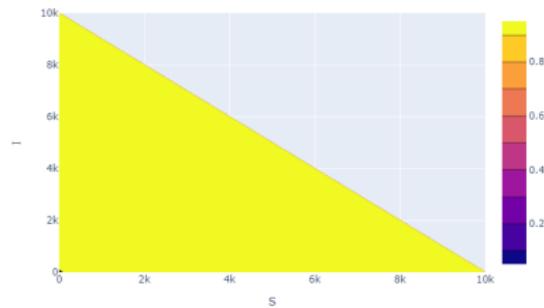
Value



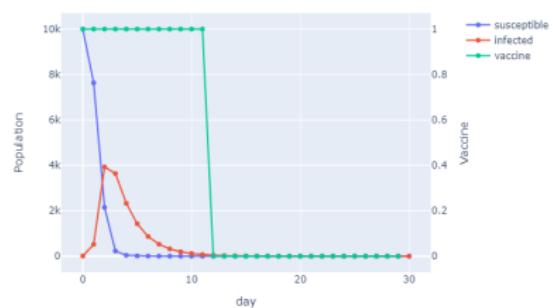
Score



Action

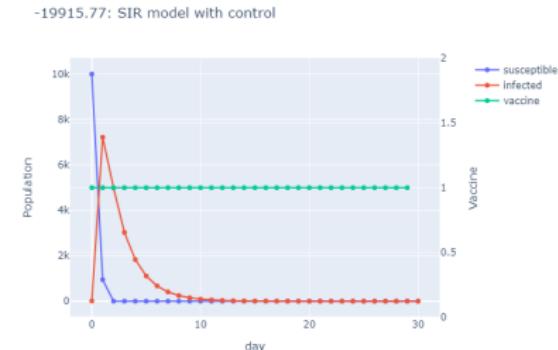
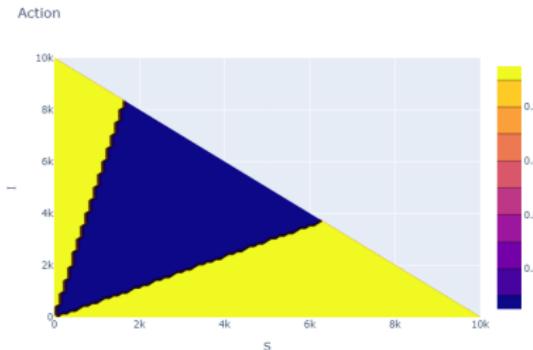
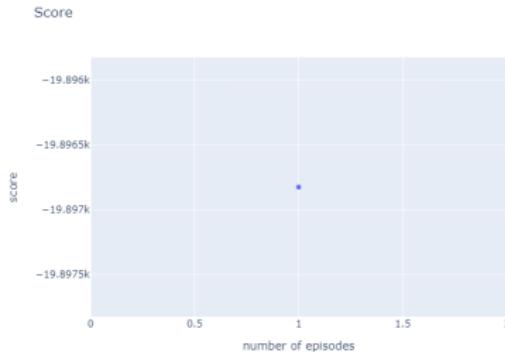
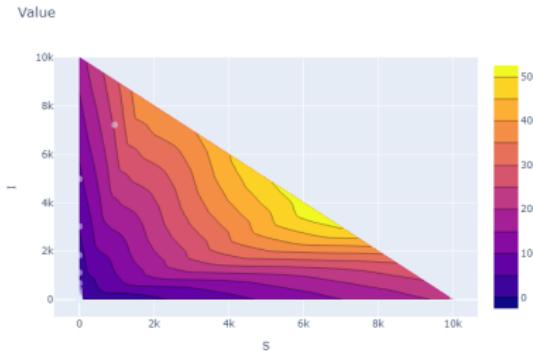


-14069.17: SIR model with control



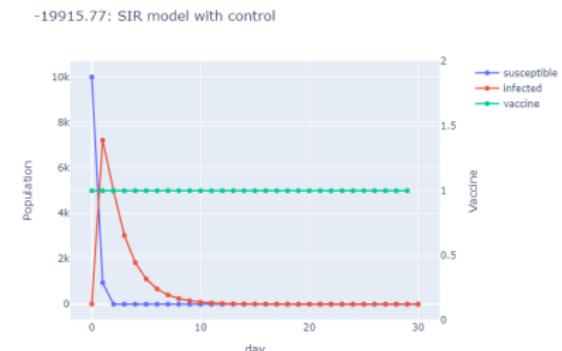
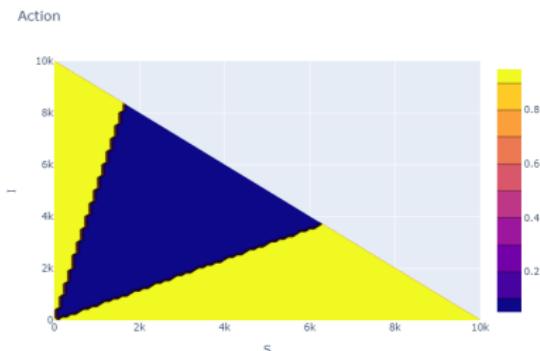
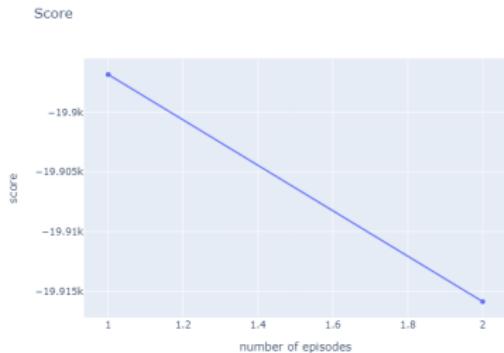
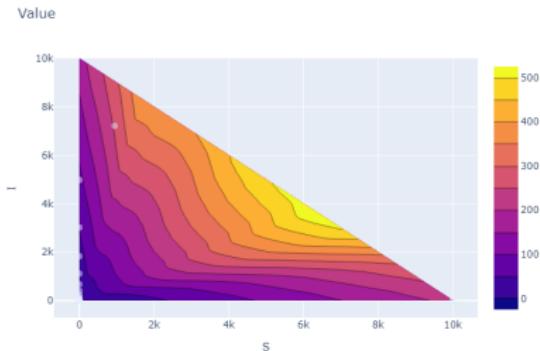
Case 3_ nu=0.1, beta=0.0010

After 1 episodes learning:



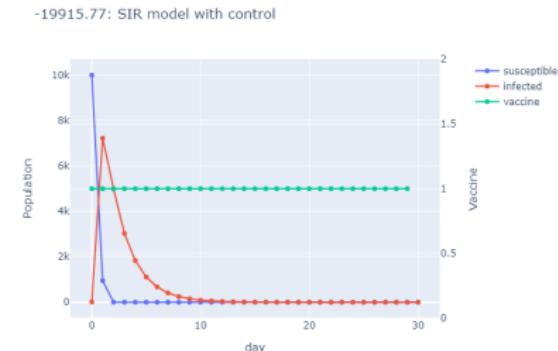
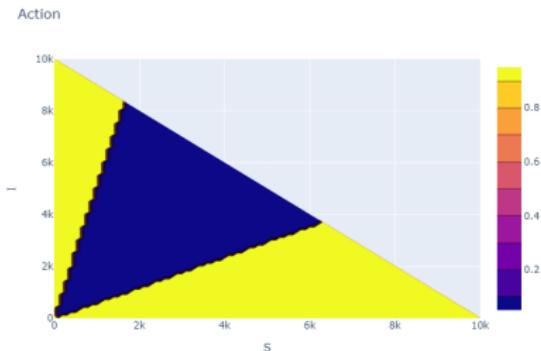
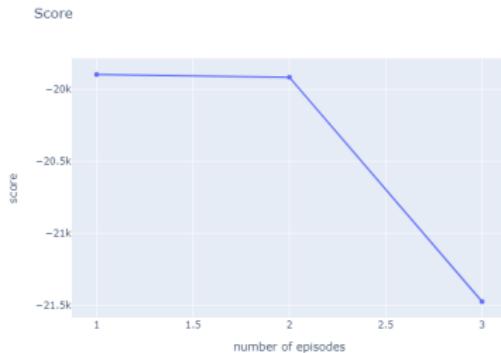
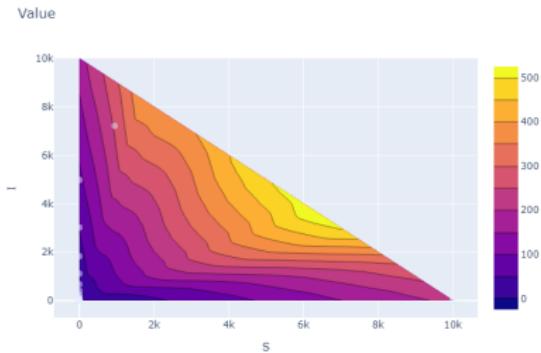
Case 3_ nu=0.1, beta=0.0010

After 2 episodes learning:



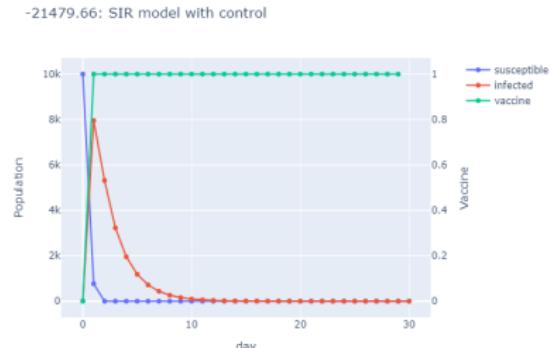
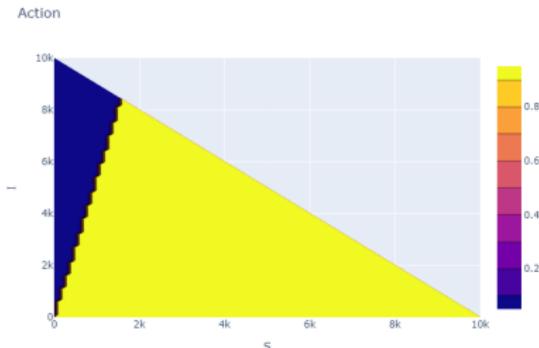
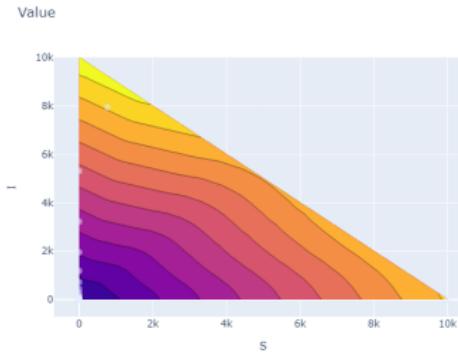
Case 3_ nu=0.1, beta=0.0010

After 3 episodes learning:



Case 3_ nu=0.1, beta=0.0010

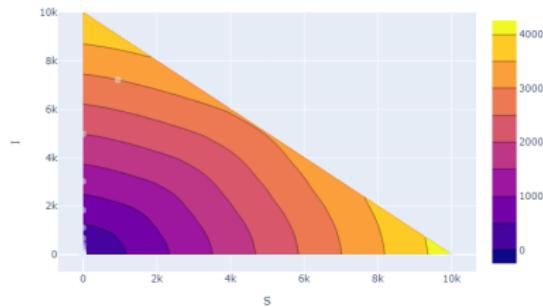
After 4 episodes learning:



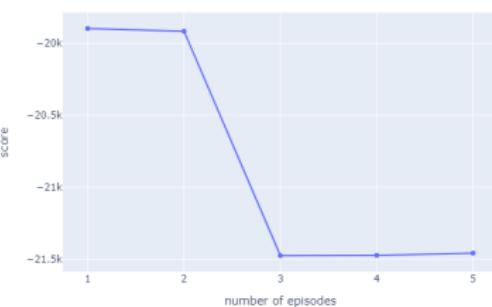
Case 3_ nu=0.1, beta=0.0010

After 5 episodes learning:

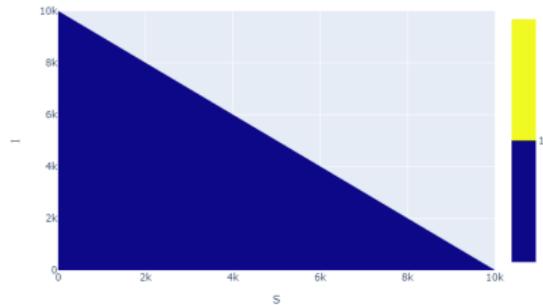
Value



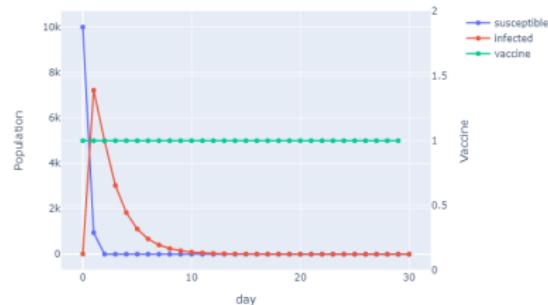
Score



Action

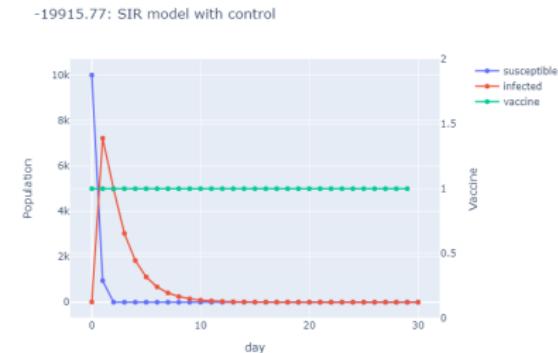
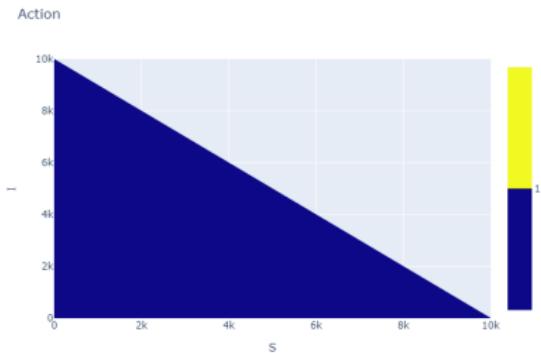
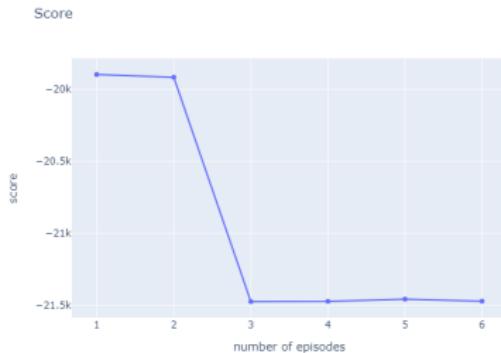
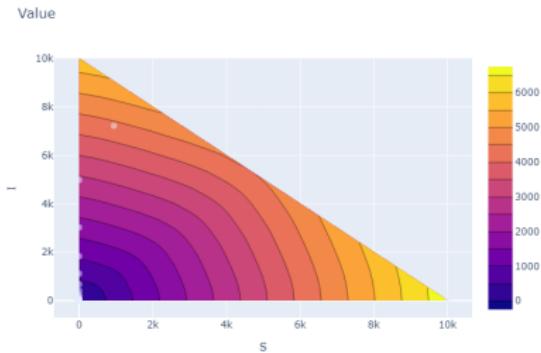


-19915.77: SIR model with control



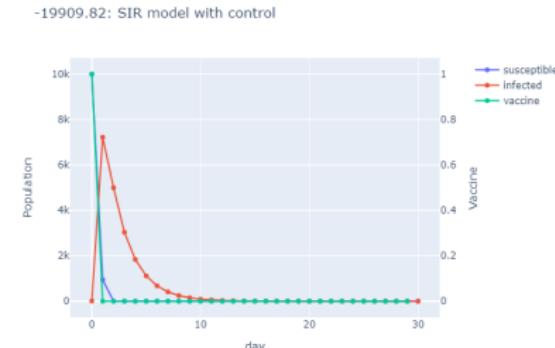
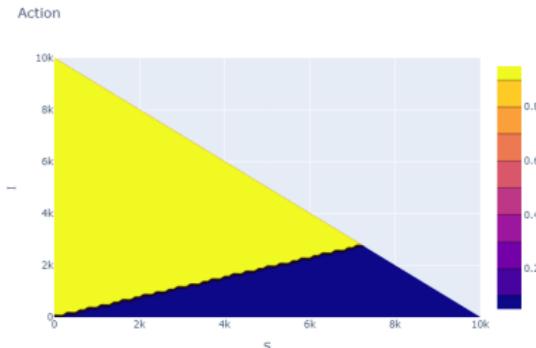
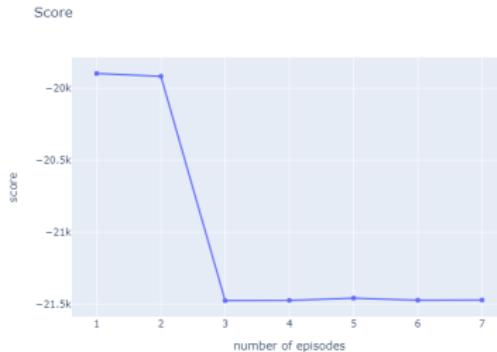
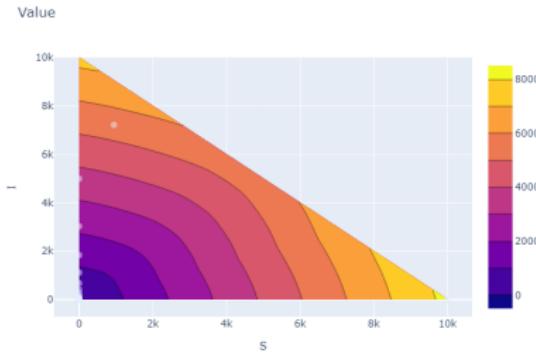
Case 3_ nu=0.1, beta=0.0010

After 6 episodes learning:



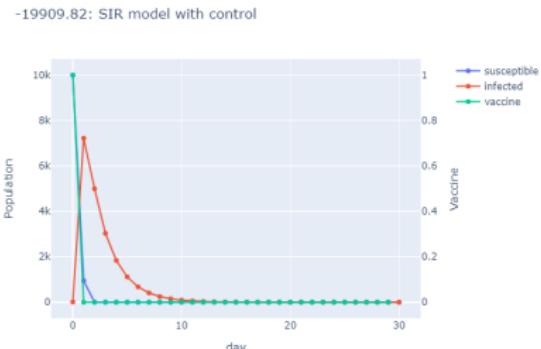
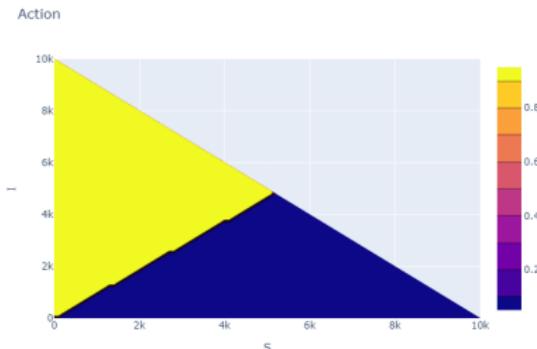
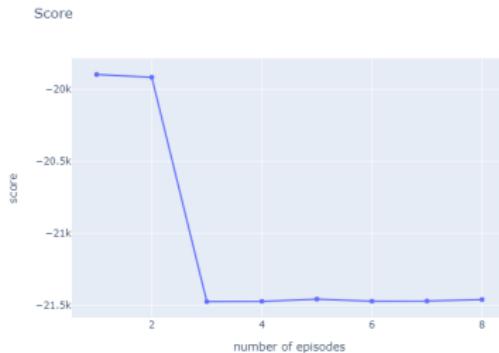
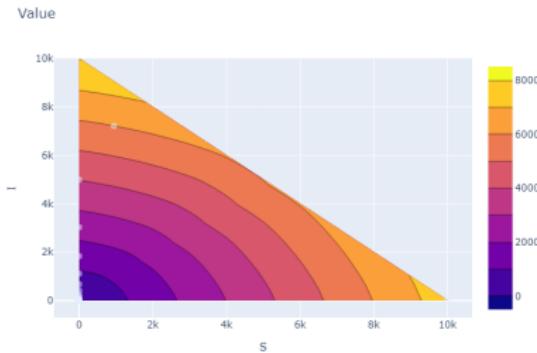
Case 3_ nu=0.1, beta=0.0010

After 7 episodes learning:



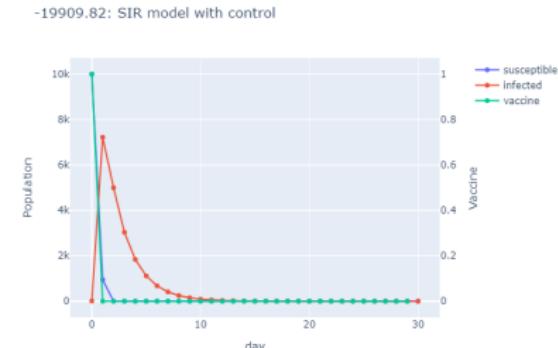
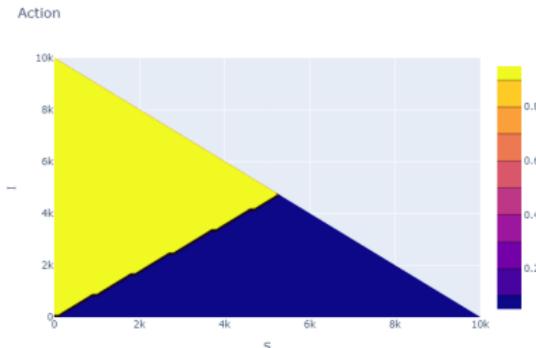
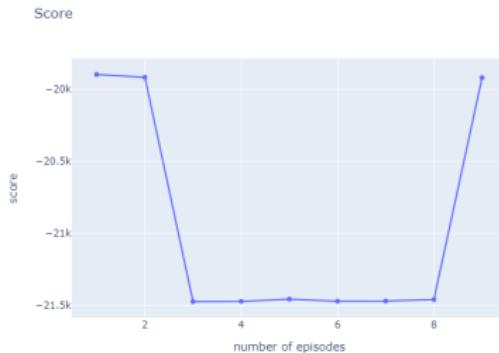
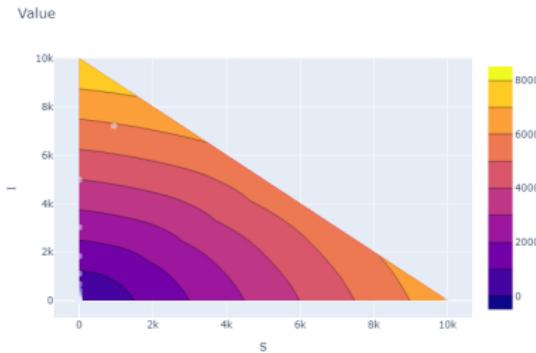
Case 3_ nu=0.1, beta=0.0010

After 8 episodes learning:



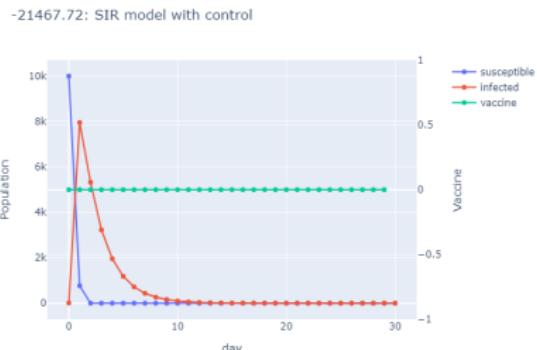
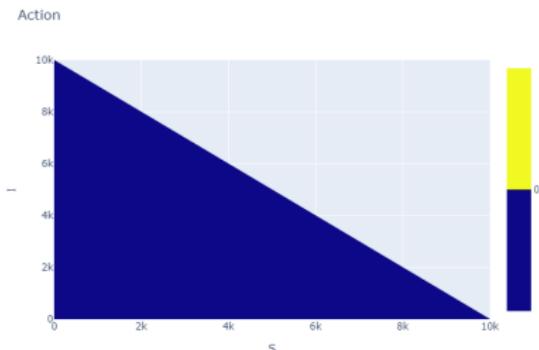
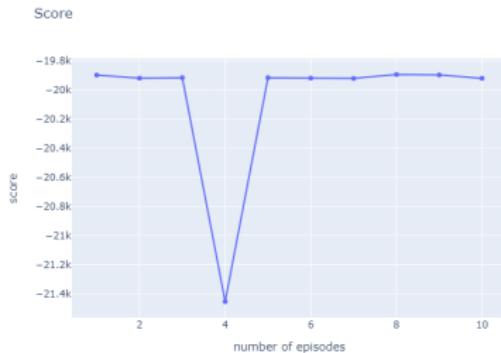
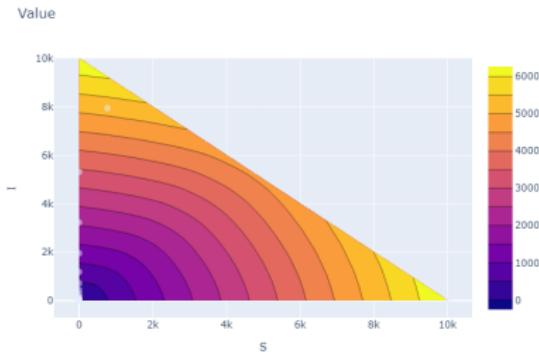
Case 3_ nu=0.1, beta=0.0010

After 9 episodes learning:



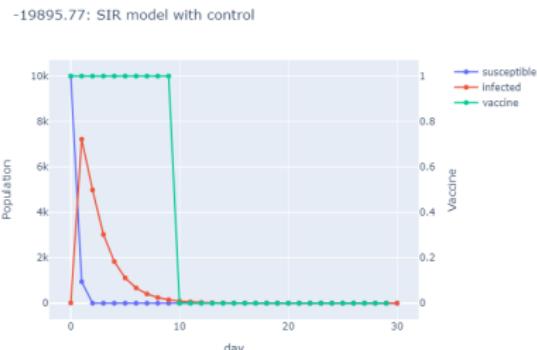
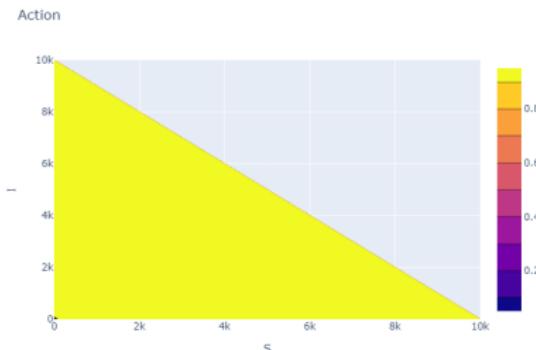
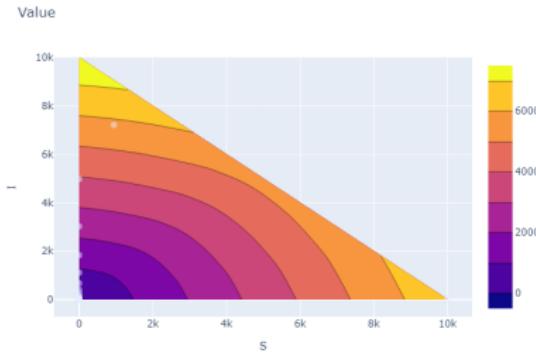
Case 3_ nu=0.1, beta=0.0010

After 10 episodes learning:



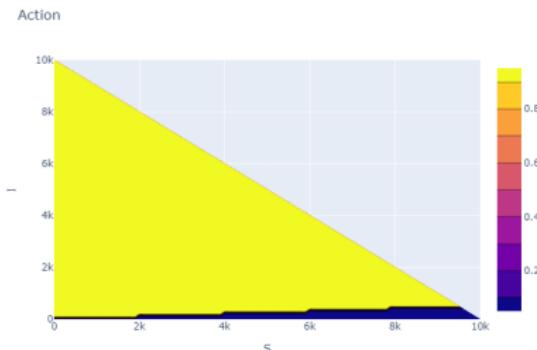
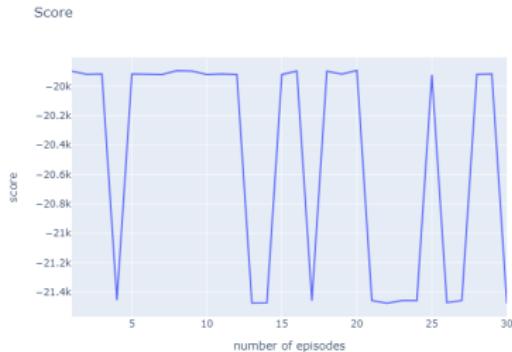
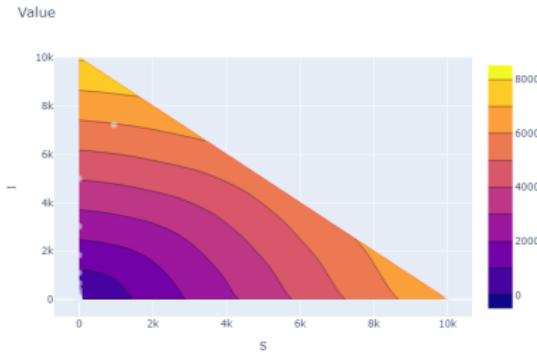
Case 3_ nu=0.1, beta=0.0010

After 20 episodes learning:



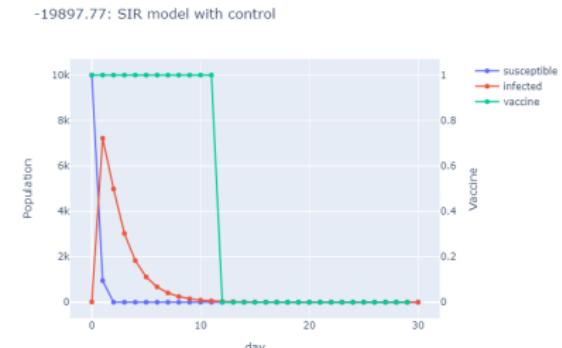
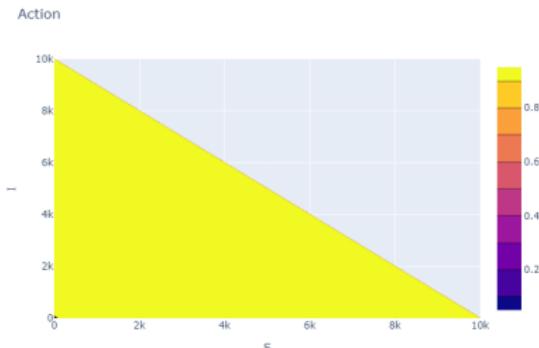
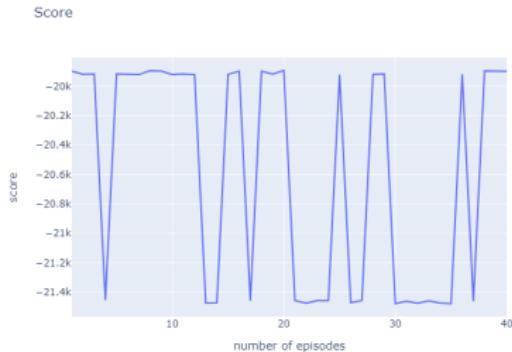
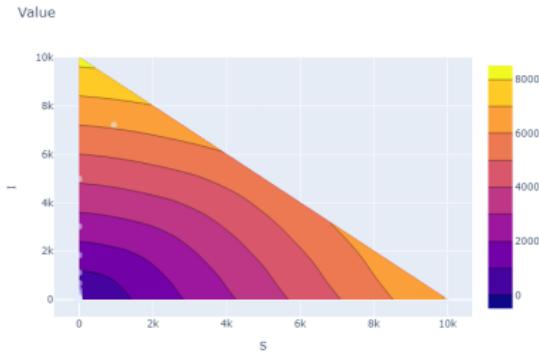
Case 3_ nu=0.1, beta=0.0010

After 30 episodes learning:



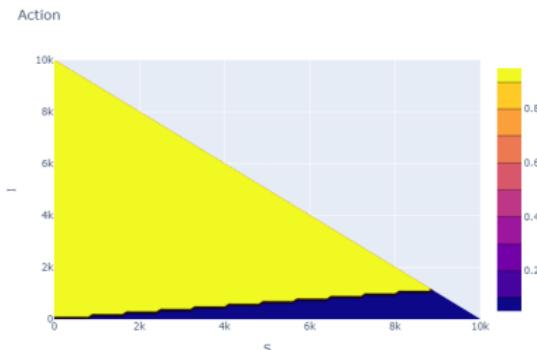
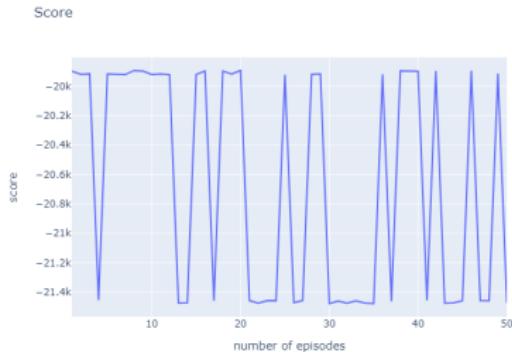
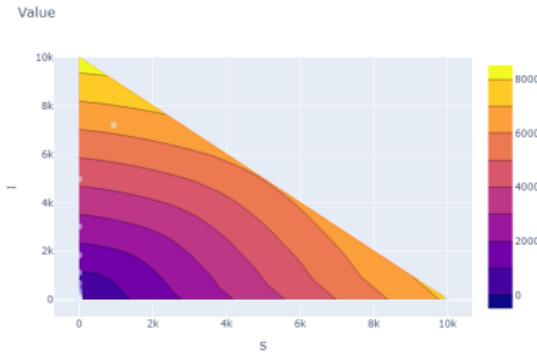
Case 3_ nu=0.1, beta=0.0010

After 40 episodes learning:



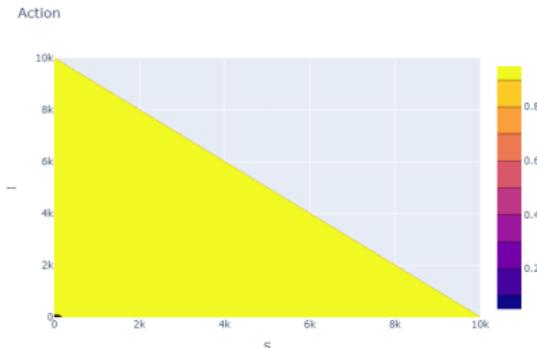
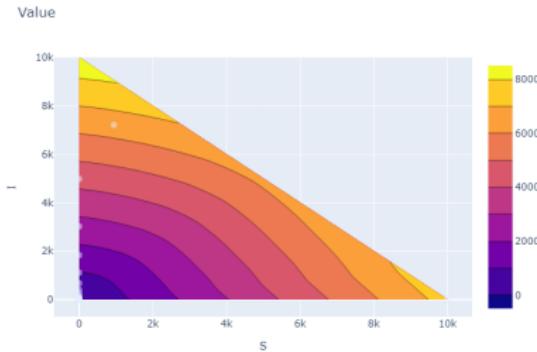
Case 3_ nu=0.1, beta=0.0010

After 50 episodes learning:



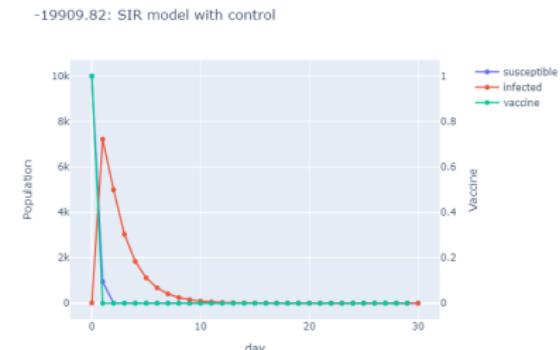
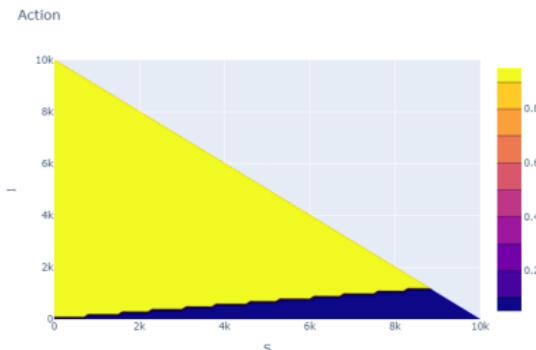
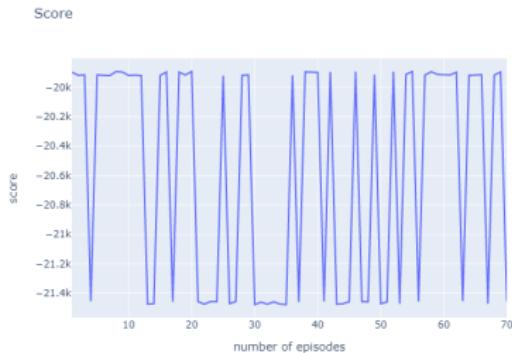
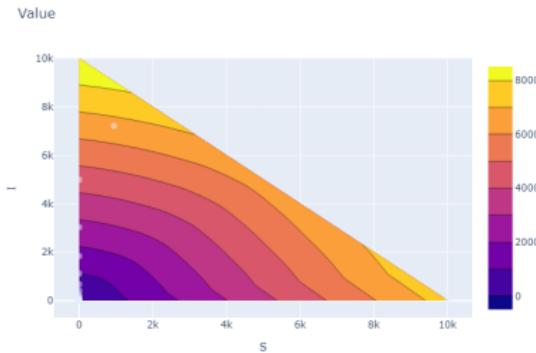
Case 3_ nu=0.1, beta=0.0010

After 60 episodes learning:



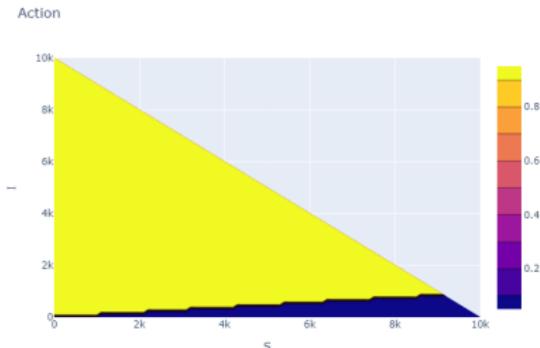
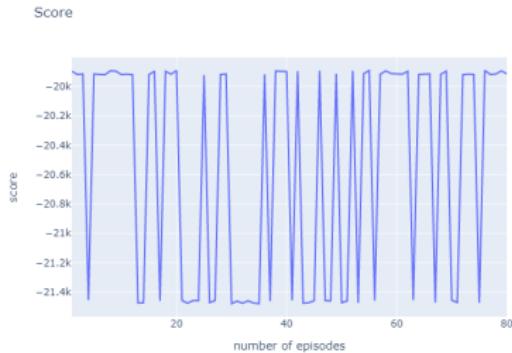
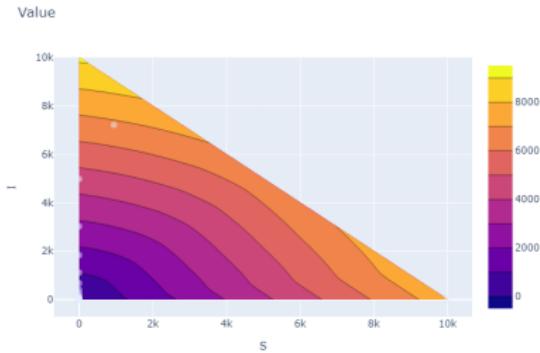
Case 3_ nu=0.1, beta=0.0010

After 70 episodes learning:



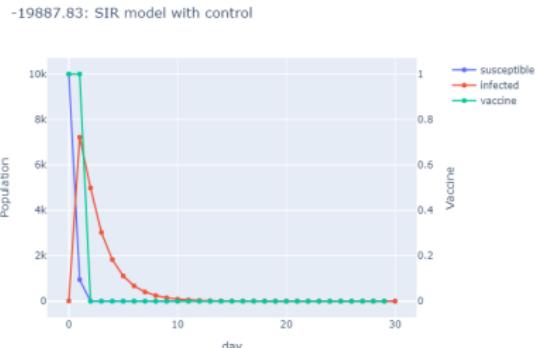
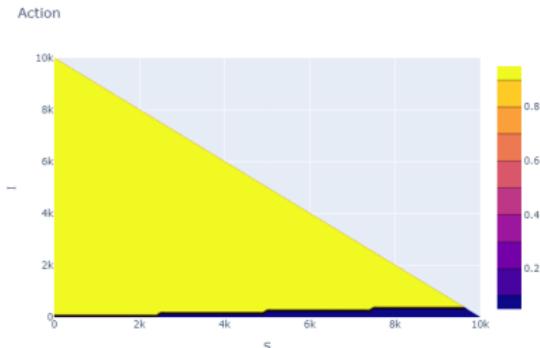
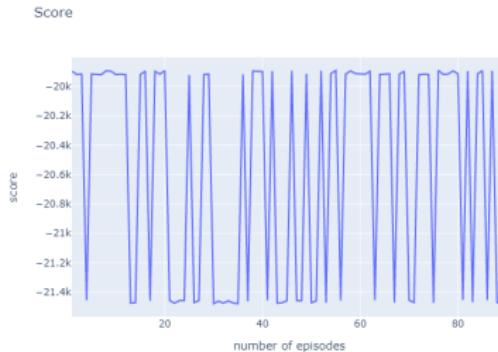
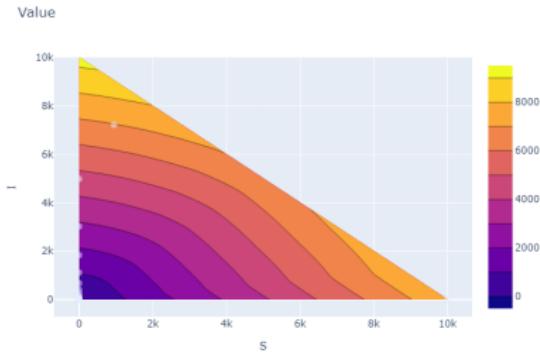
Case 3_ nu=0.1, beta=0.0010

After 80 episodes learning:



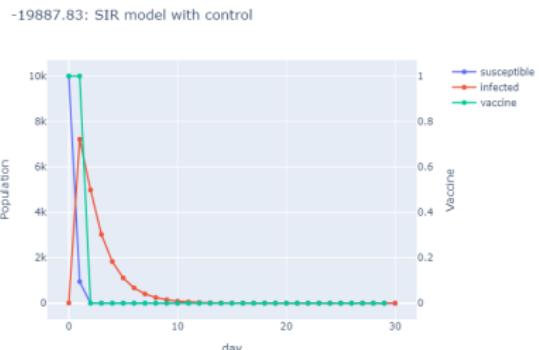
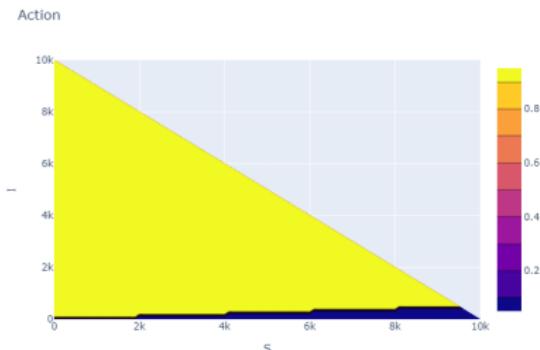
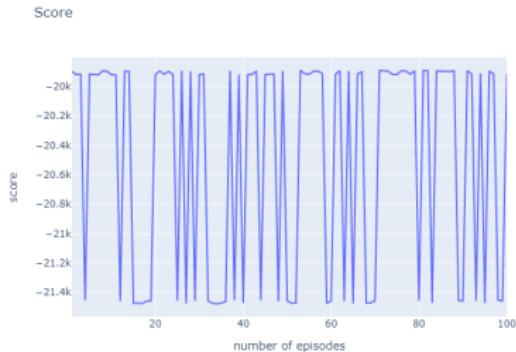
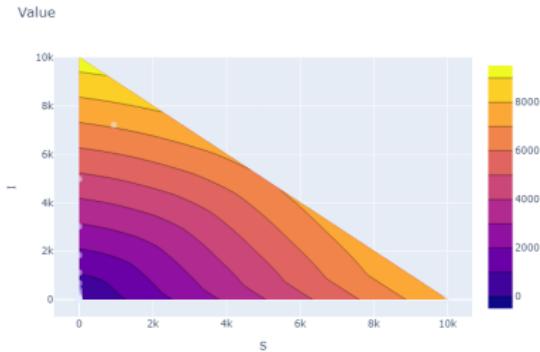
Case 3_ nu=0.1, beta=0.0010

After 90 episodes learning:



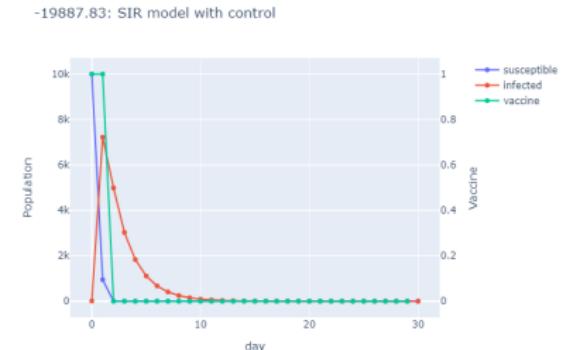
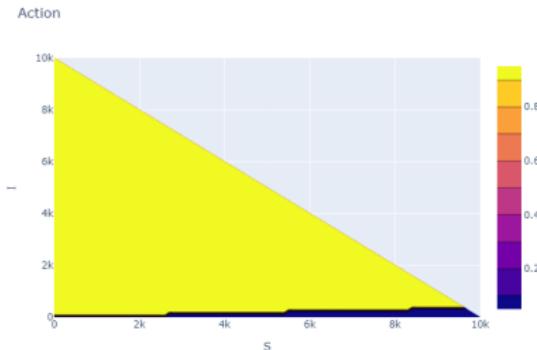
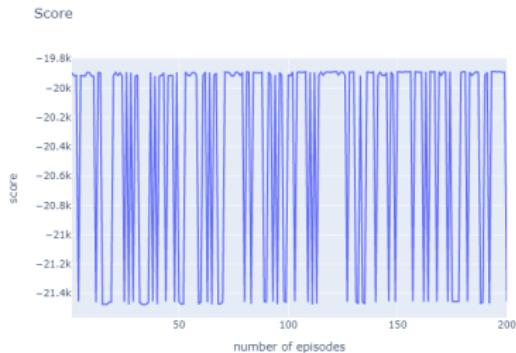
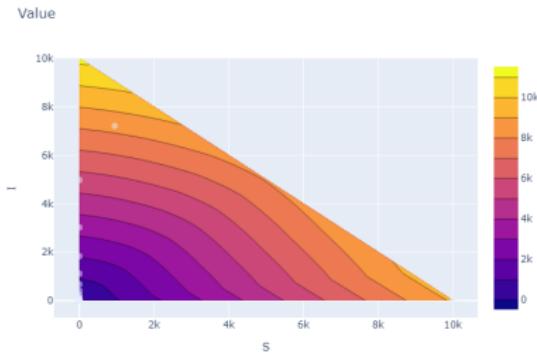
Case 3_ nu=0.1, beta=0.0010

After 100 episodes learning:



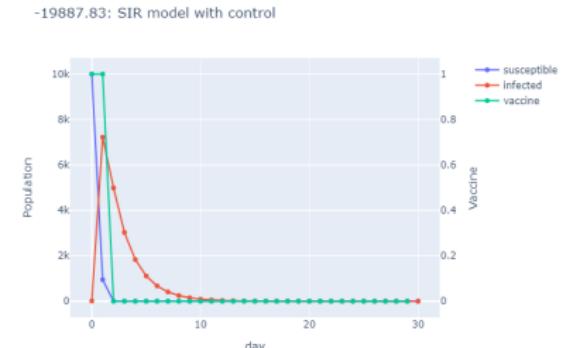
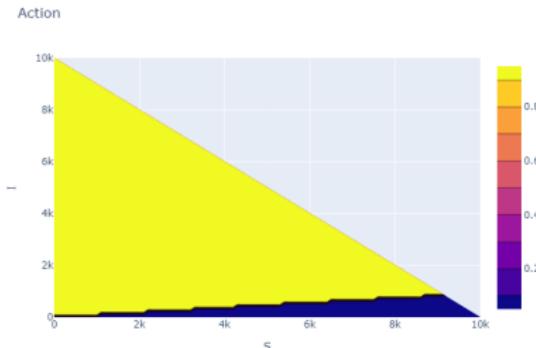
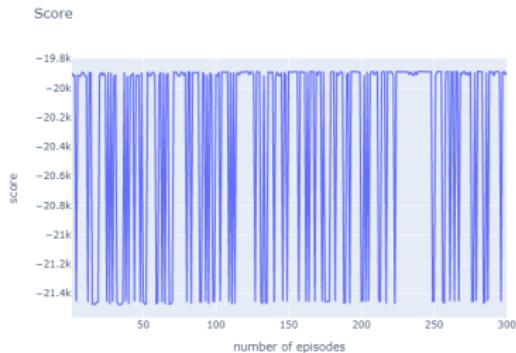
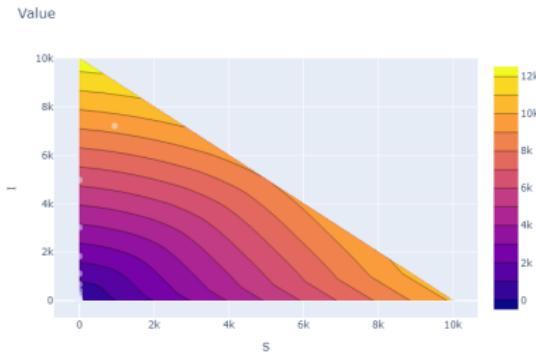
Case 3_ nu=0.1, beta=0.0010

After 200 episodes learning:



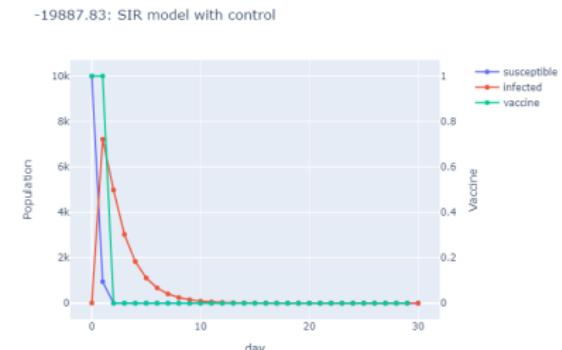
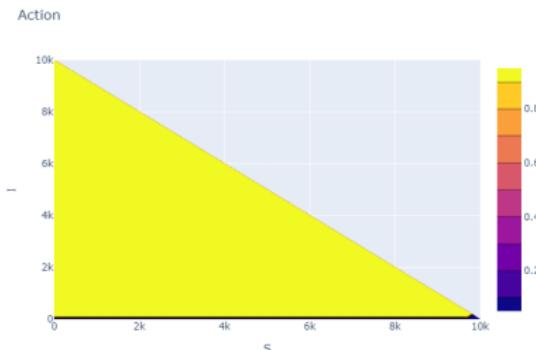
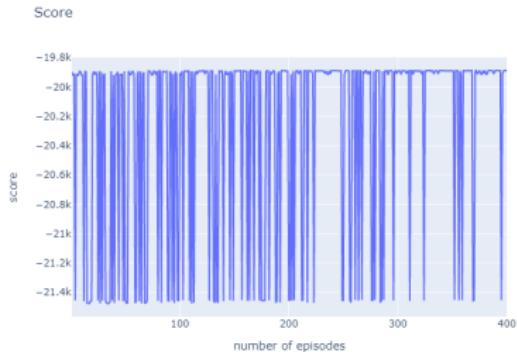
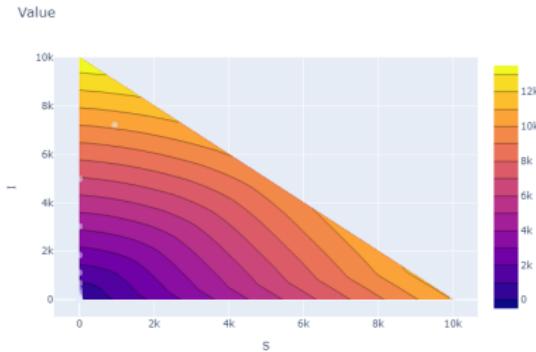
Case 3_ nu=0.1, beta=0.0010

After 300 episodes learning:



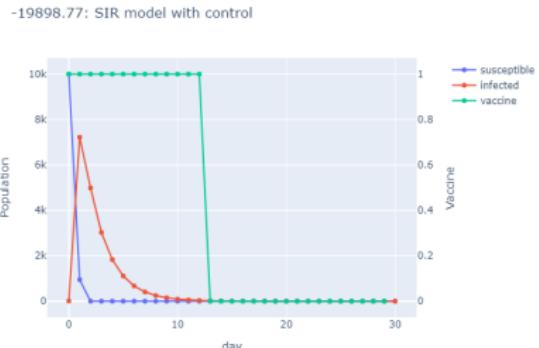
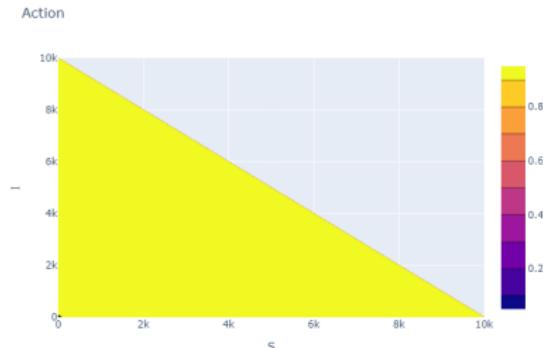
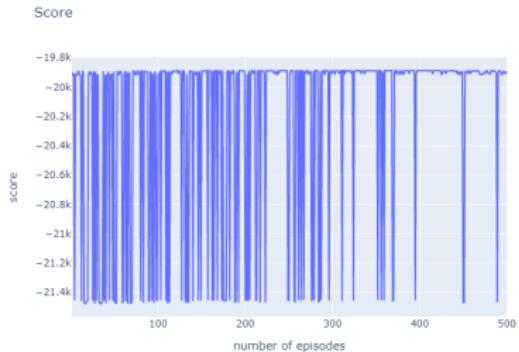
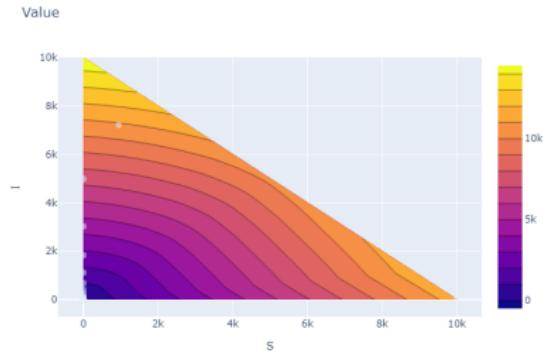
Case 3_ nu=0.1, beta=0.0010

After 400 episodes learning:



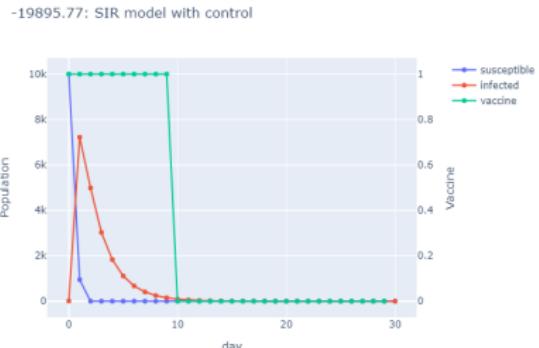
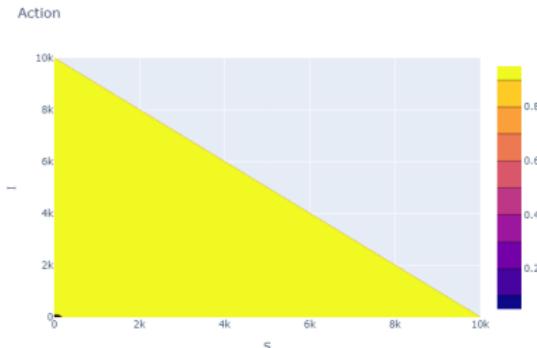
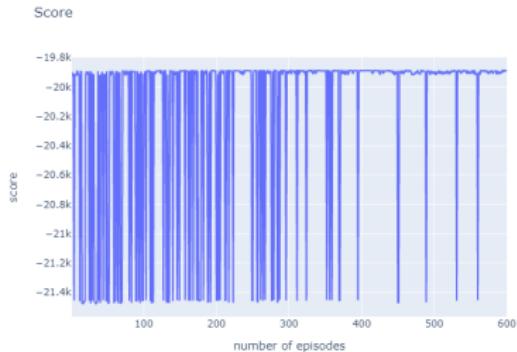
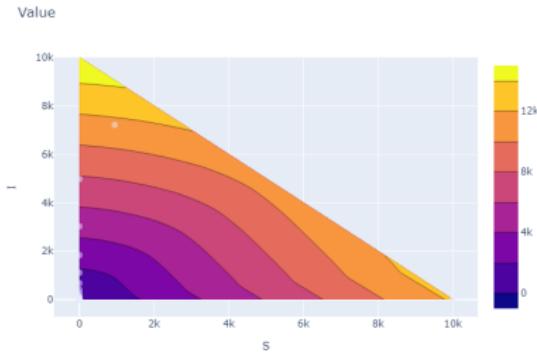
Case 3_ nu=0.1, beta=0.0010

After 500 episodes learning:



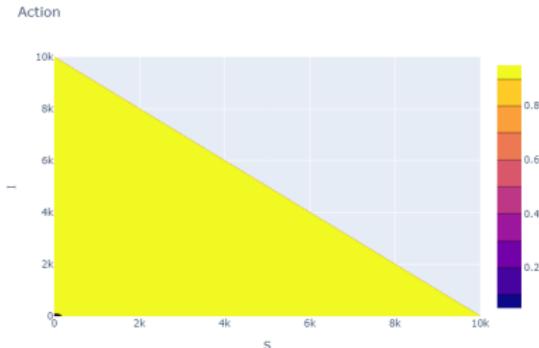
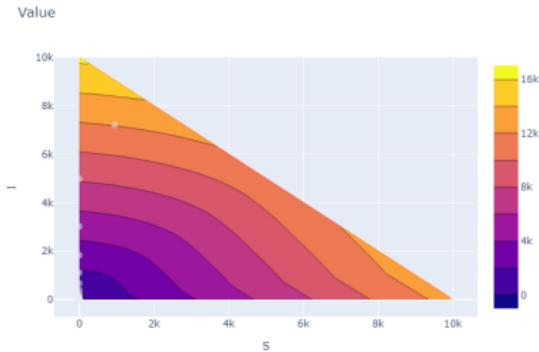
Case 3_ nu=0.1, beta=0.0010

After 600 episodes learning:



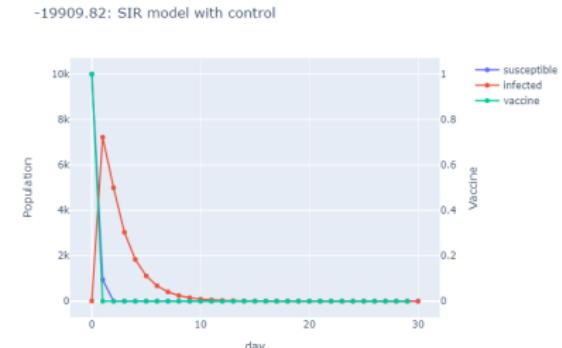
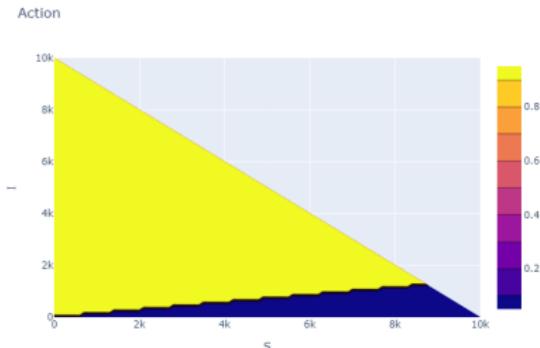
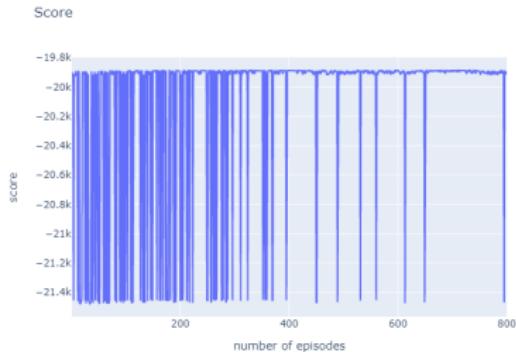
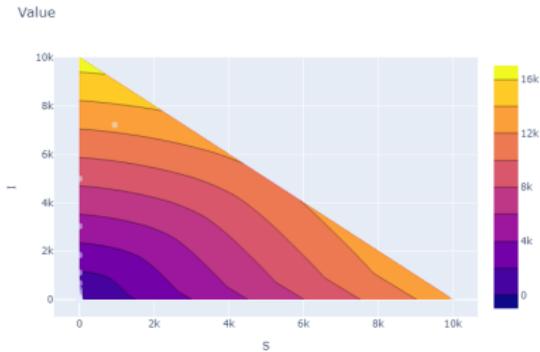
Case 3_ nu=0.1, beta=0.0010

After 700 episodes learning:



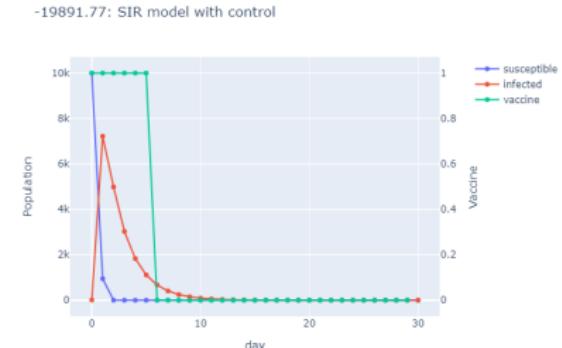
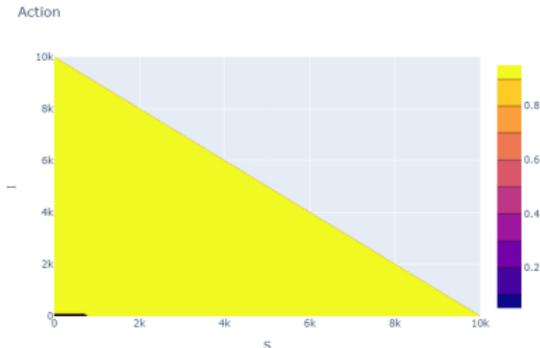
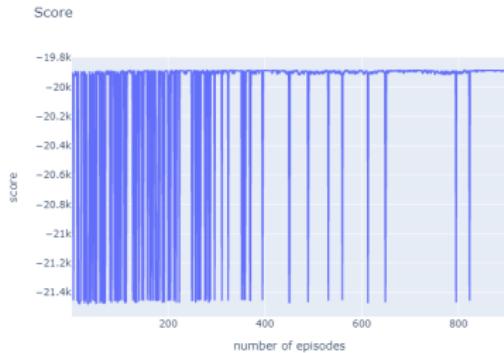
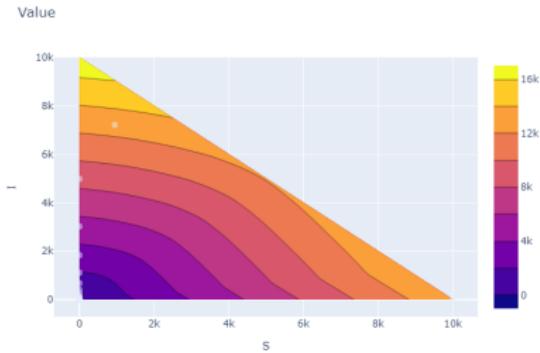
Case 3_ nu=0.1, beta=0.0010

After 800 episodes learning:



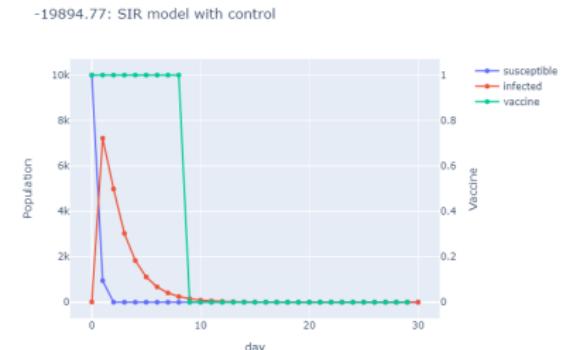
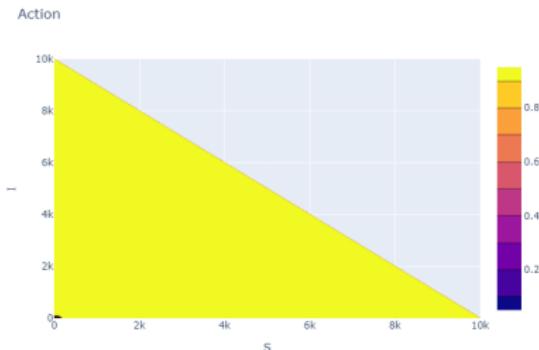
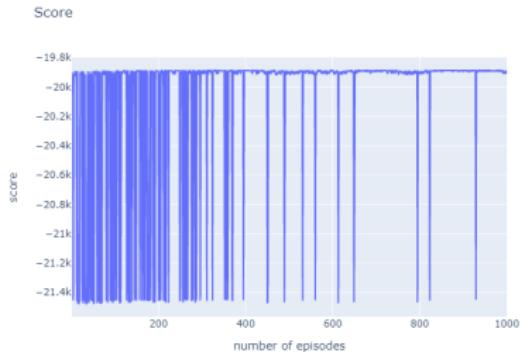
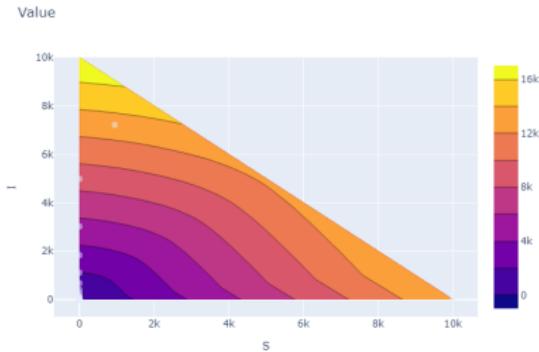
Case 3_ nu=0.1, beta=0.0010

After 900 episodes learning:



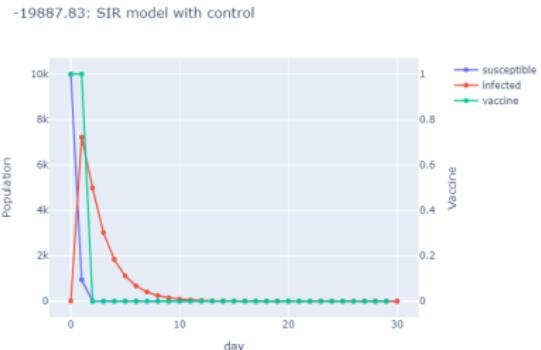
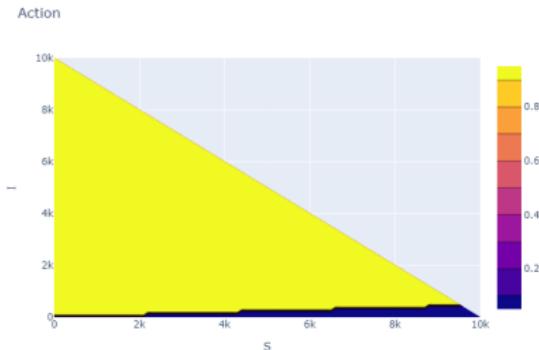
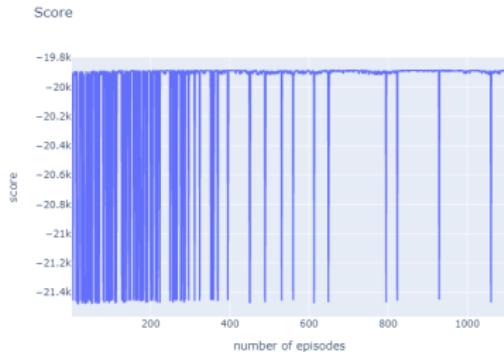
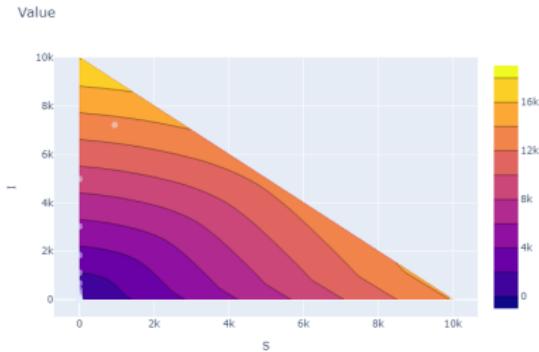
Case 3_ nu=0.1, beta=0.0010

After 1000 episodes learning:



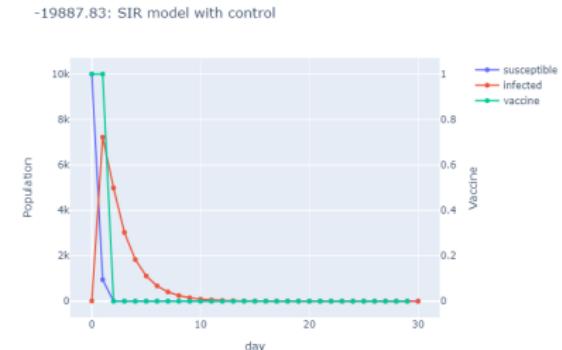
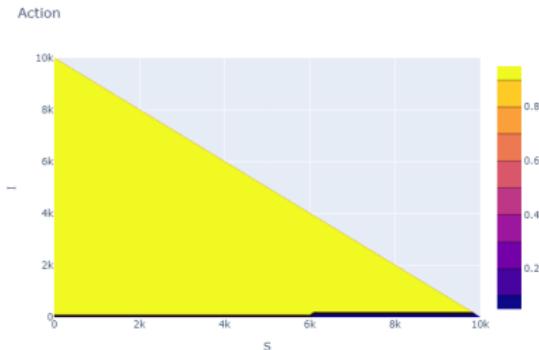
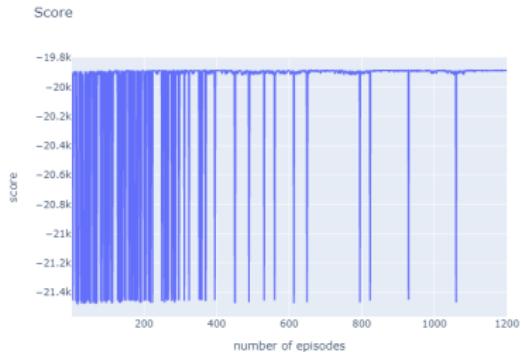
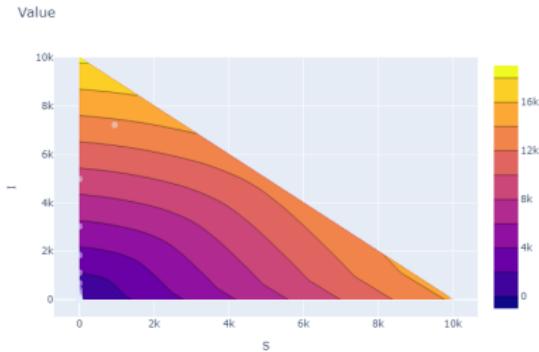
Case 3_ nu=0.1, beta=0.0010

After 1100 episodes learning:



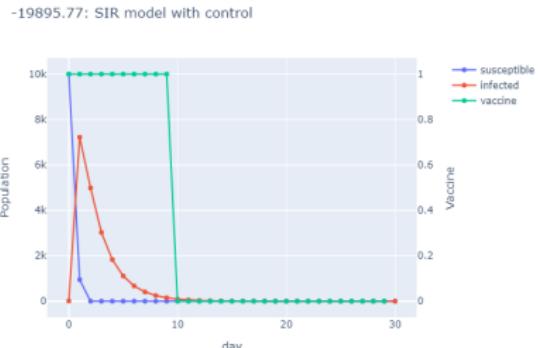
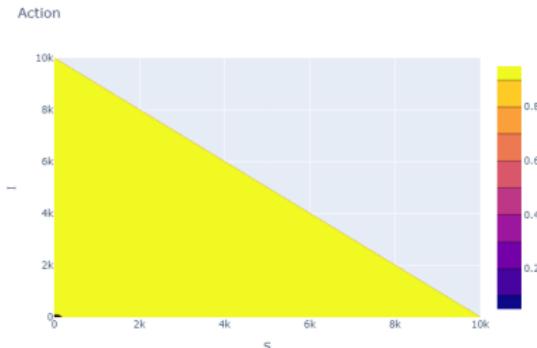
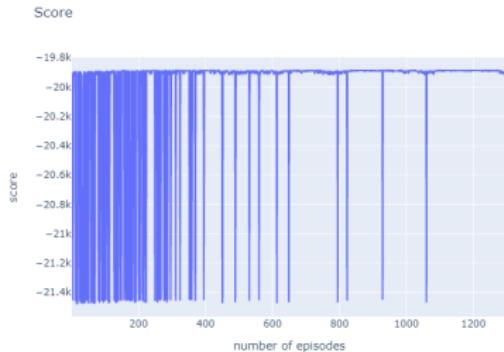
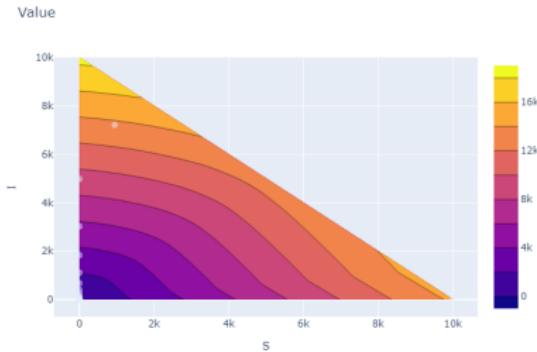
Case 3_ nu=0.1, beta=0.0010

After 1200 episodes learning:



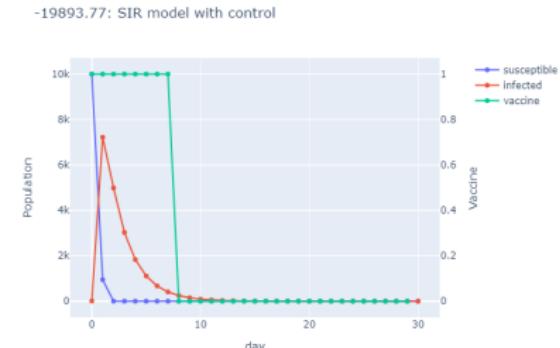
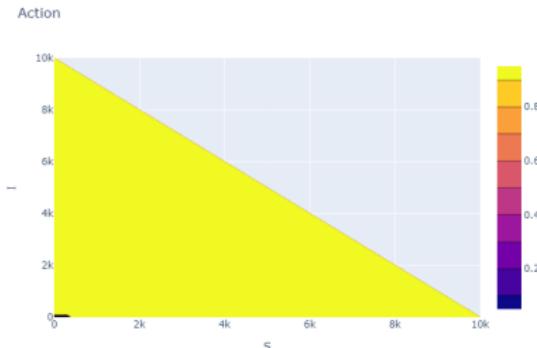
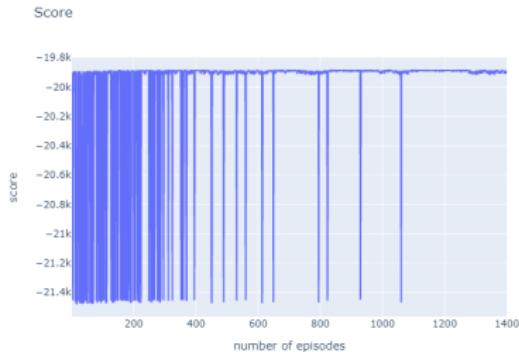
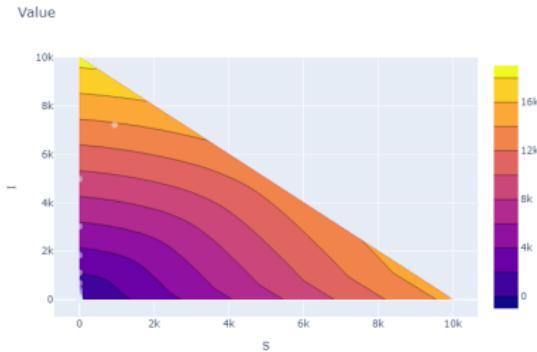
Case 3_ nu=0.1, beta=0.0010

After 1300 episodes learning:



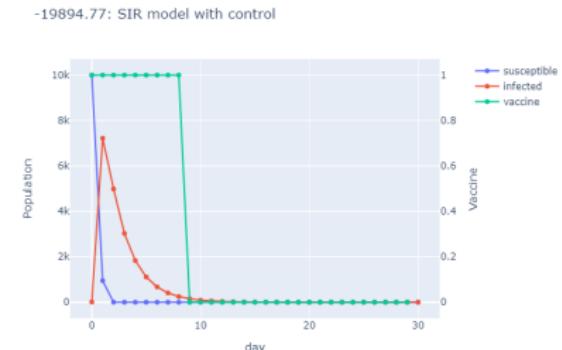
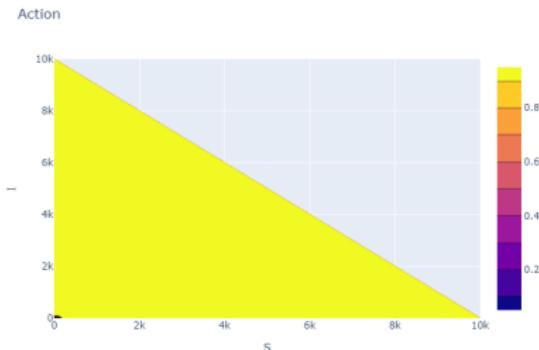
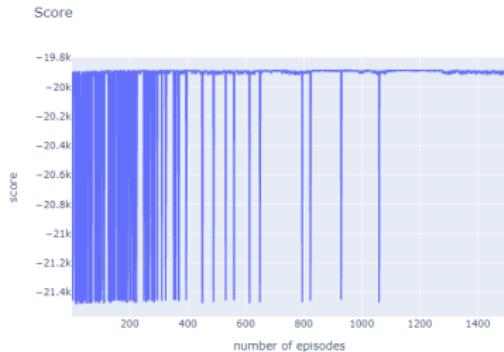
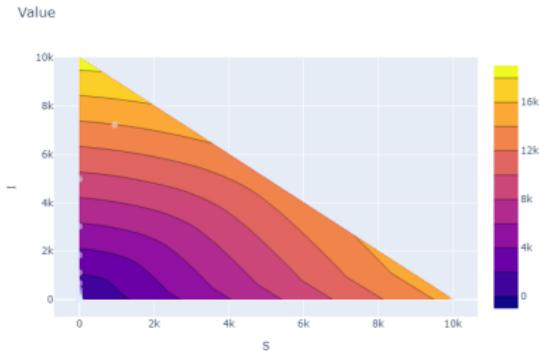
Case 3_ nu=0.1, beta=0.0010

After 1400 episodes learning:



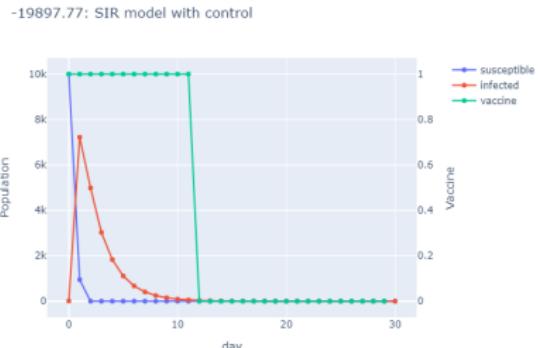
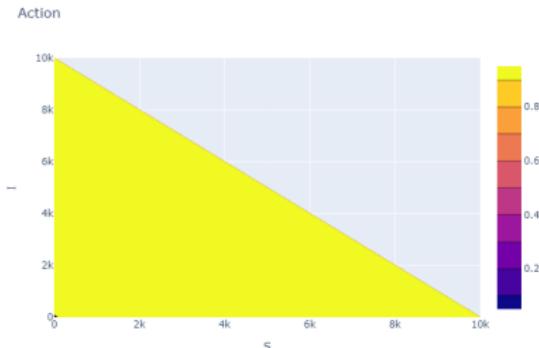
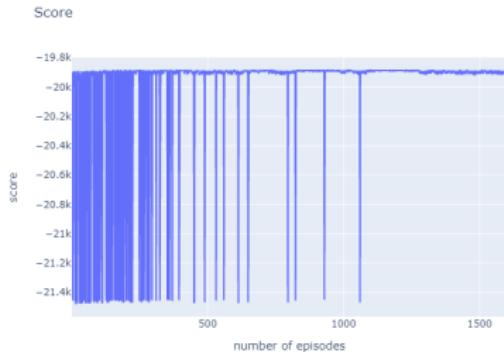
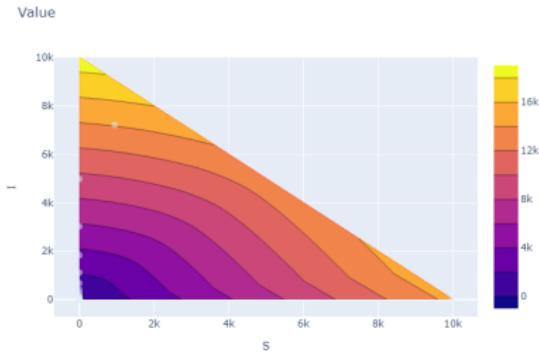
Case 3_ nu=0.1, beta=0.0010

After 1500 episodes learning:



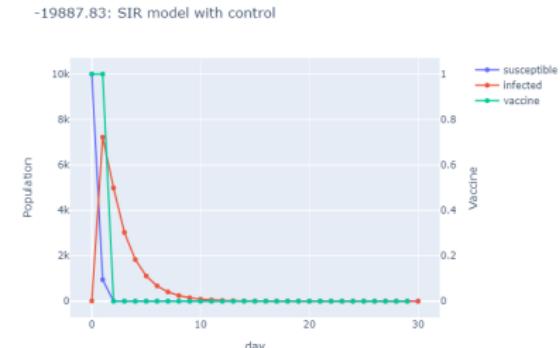
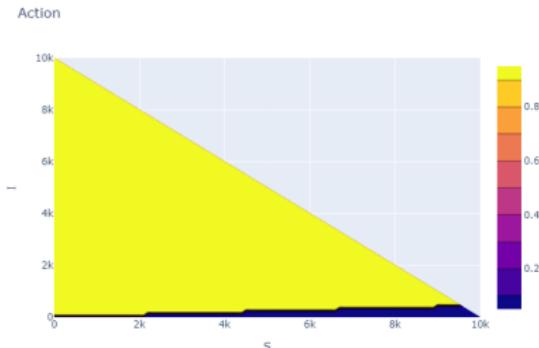
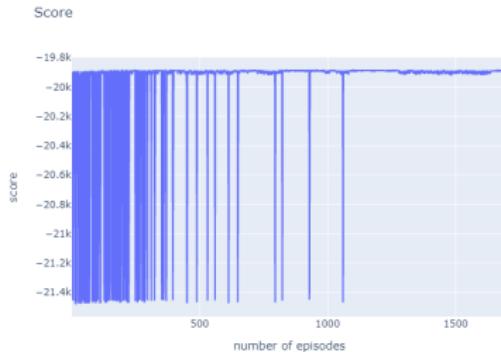
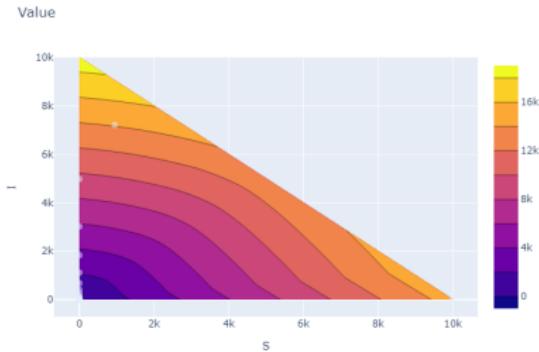
Case 3_ nu=0.1, beta=0.0010

After 1600 episodes learning:



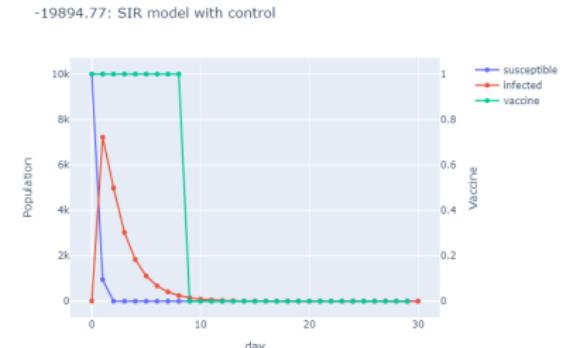
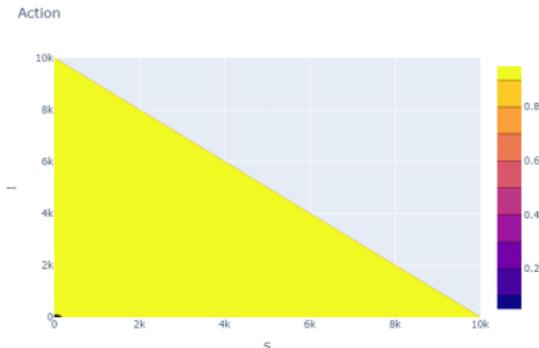
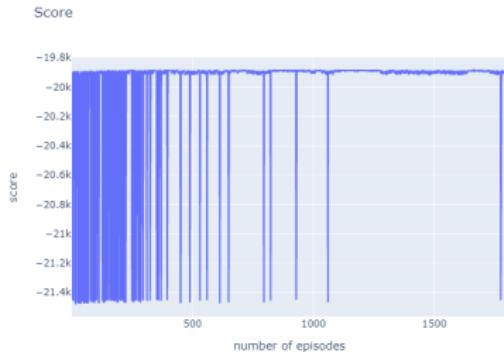
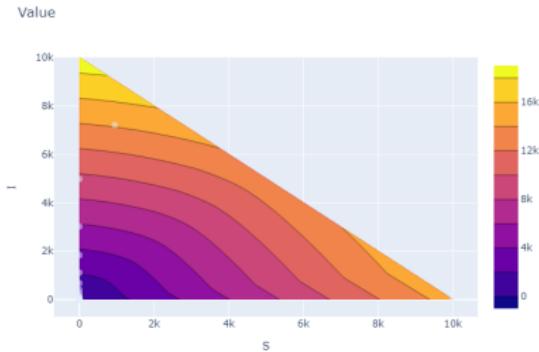
Case 3_ nu=0.1, beta=0.0010

After 1700 episodes learning:



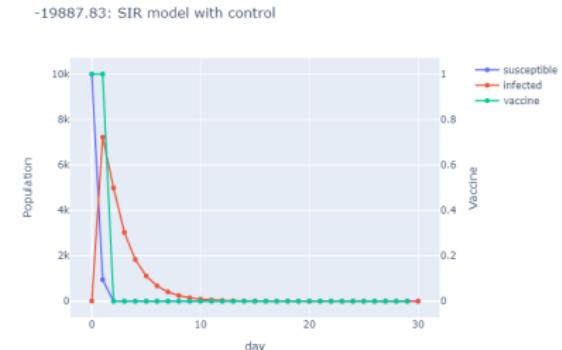
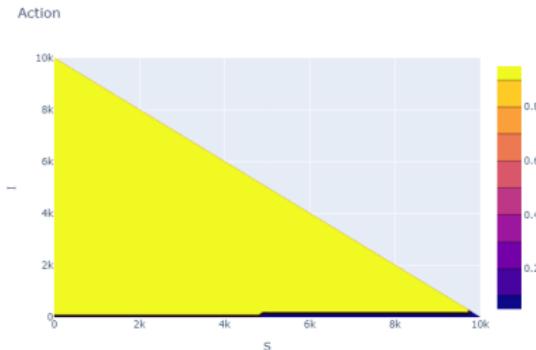
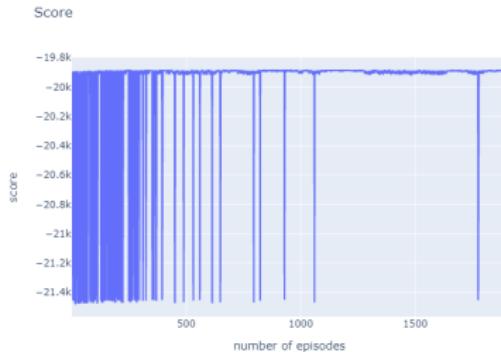
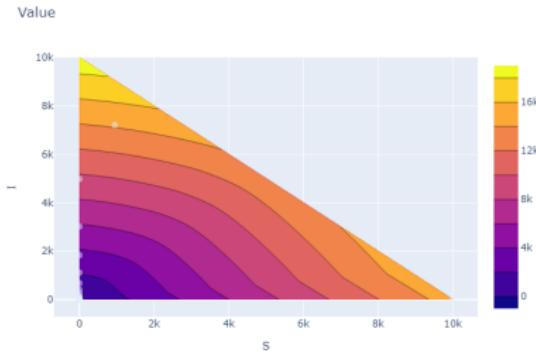
Case 3_ nu=0.1, beta=0.0010

After 1800 episodes learning:



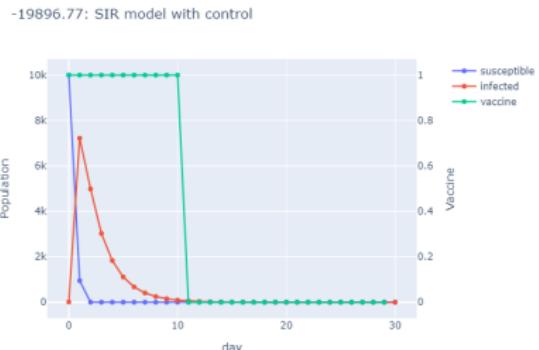
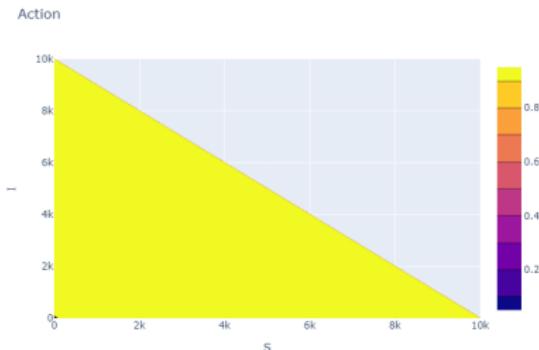
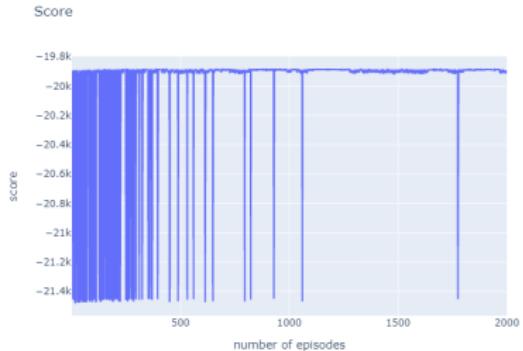
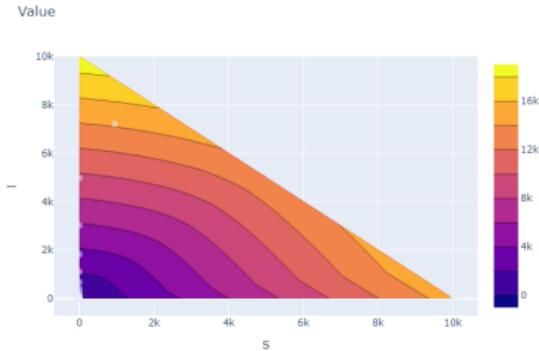
Case 3_ nu=0.1, beta=0.0010

After 1900 episodes learning:



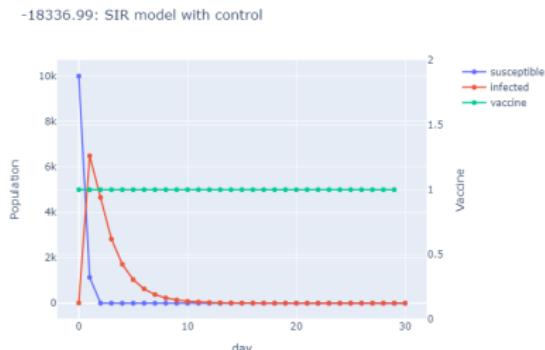
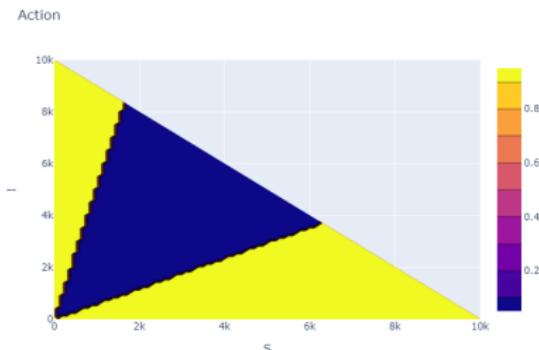
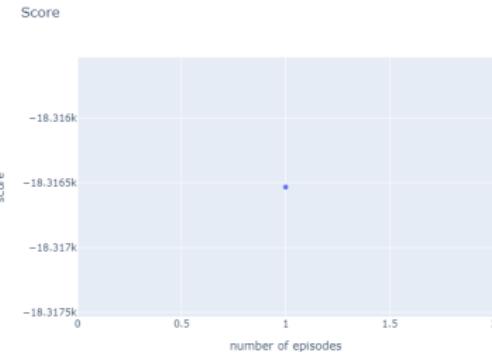
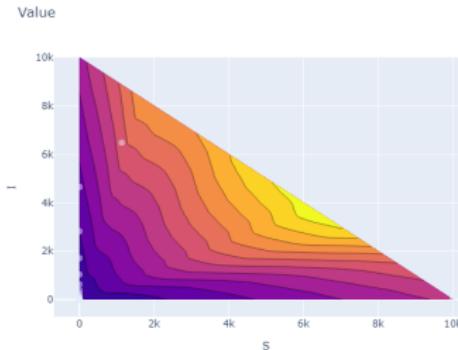
Case 3_ nu=0.1, beta=0.0010

After 2000 episodes learning:



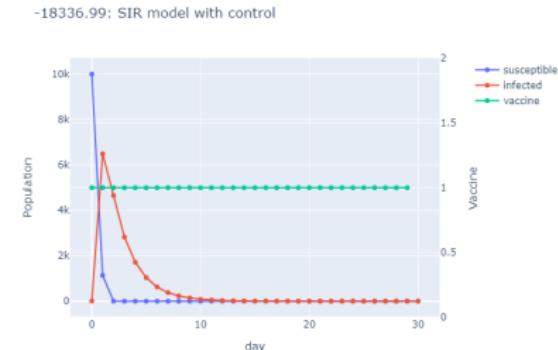
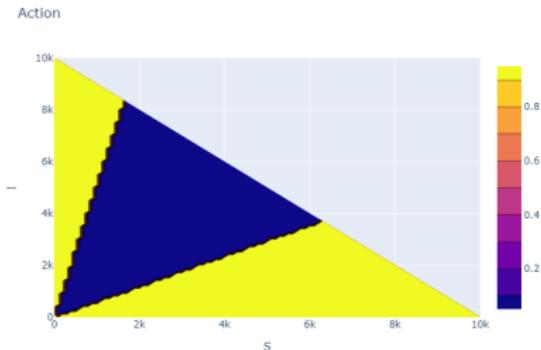
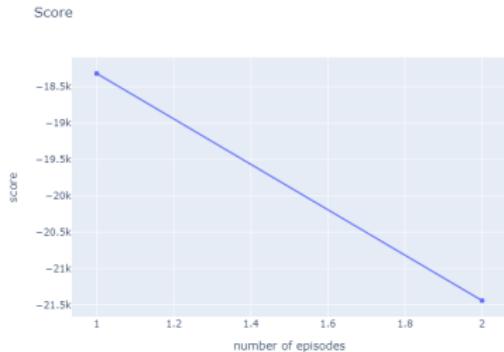
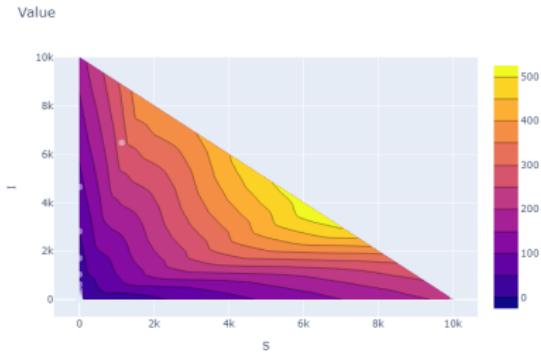
Case 4_ nu=0.2, beta=0.0010

After 1 episodes learning:



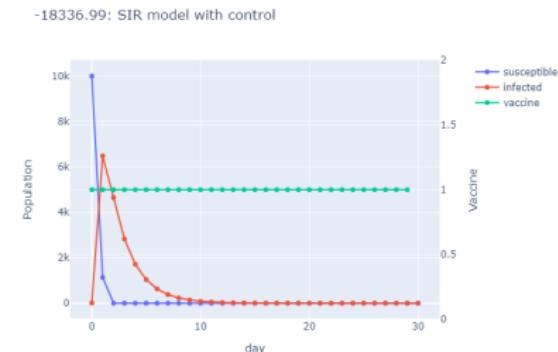
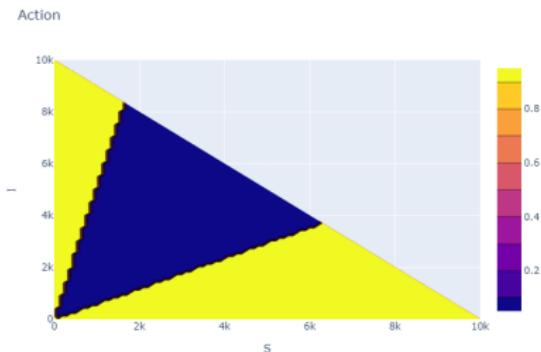
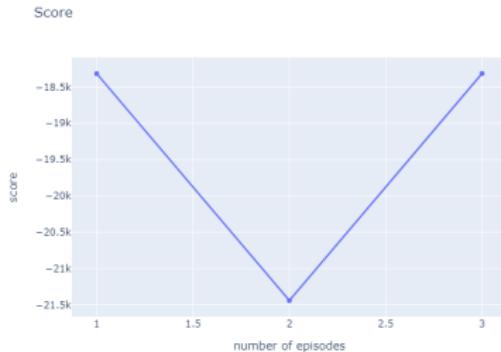
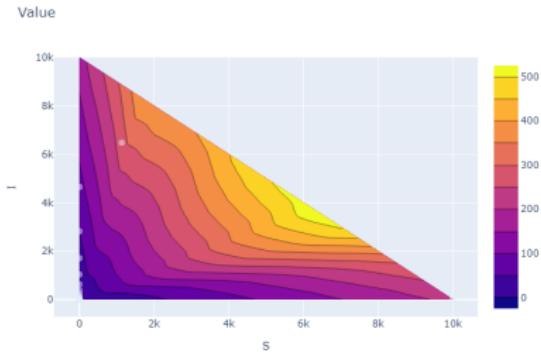
Case 4_ nu=0.2, beta=0.0010

After 2 episodes learning:



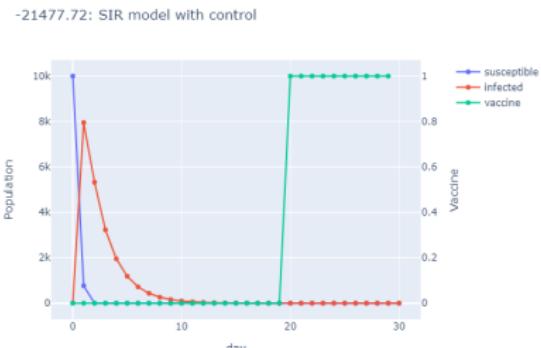
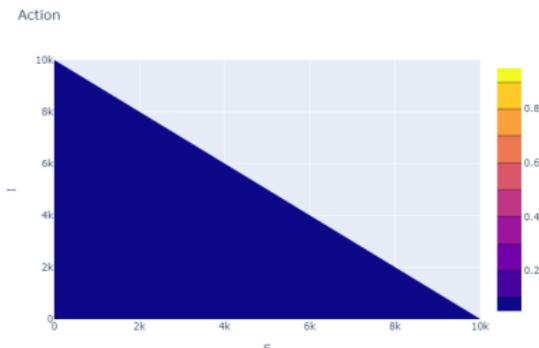
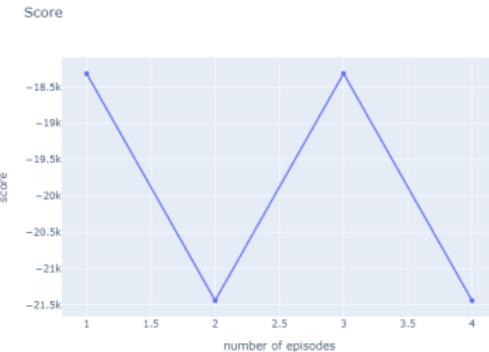
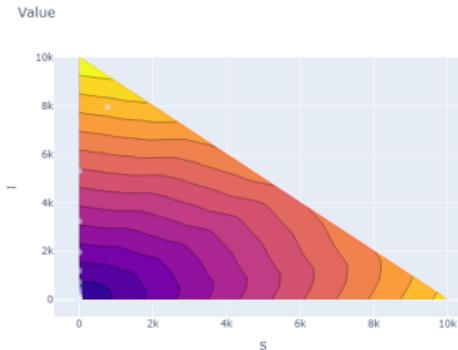
Case 4_ nu=0.2, beta=0.0010

After 3 episodes learning:



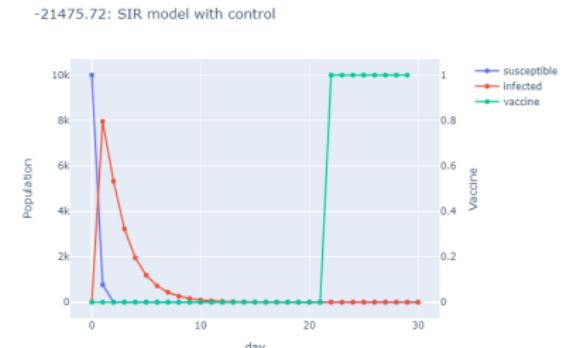
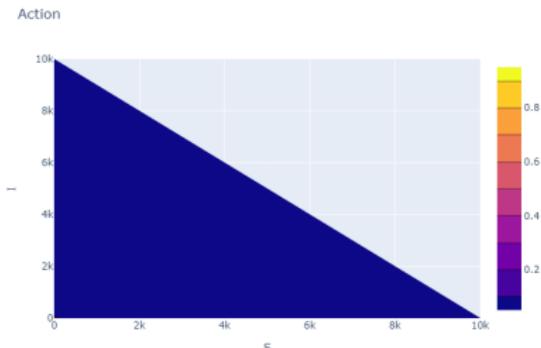
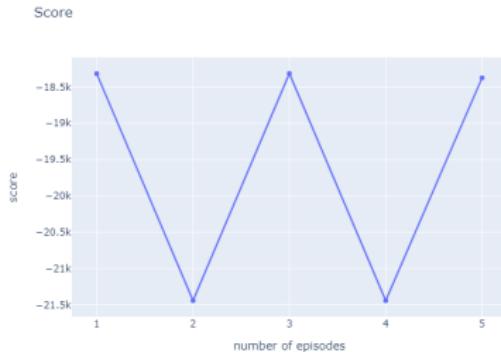
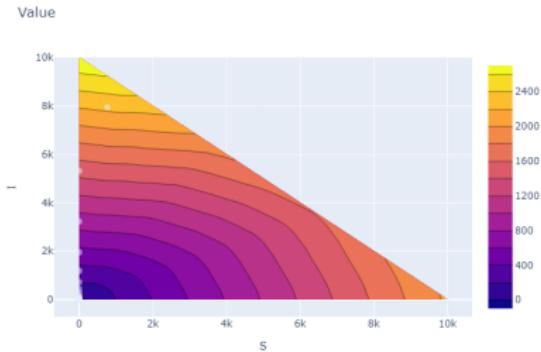
Case 4_ nu=0.2, beta=0.0010

After 4 episodes learning:



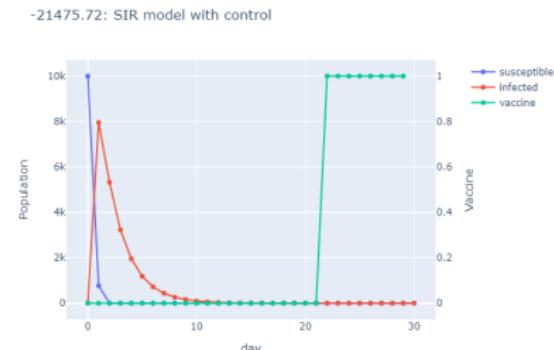
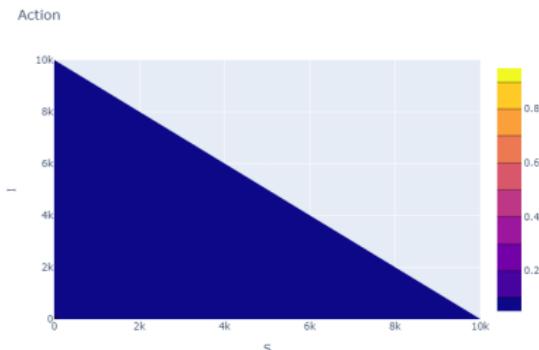
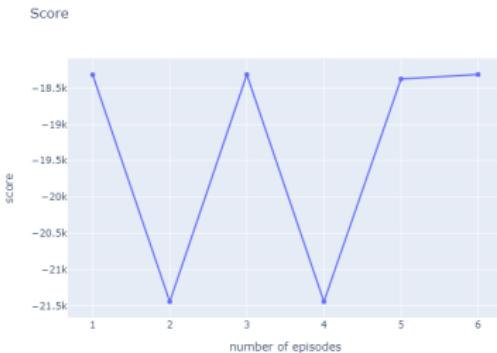
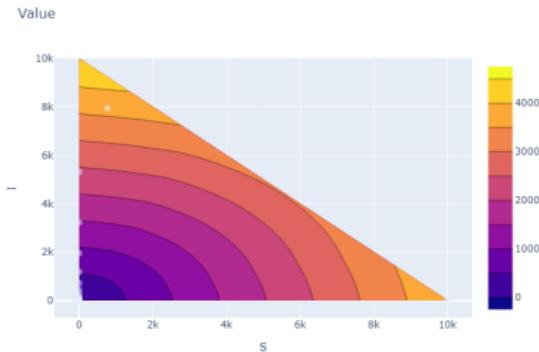
Case 4_ nu=0.2, beta=0.0010

After 5 episodes learning:



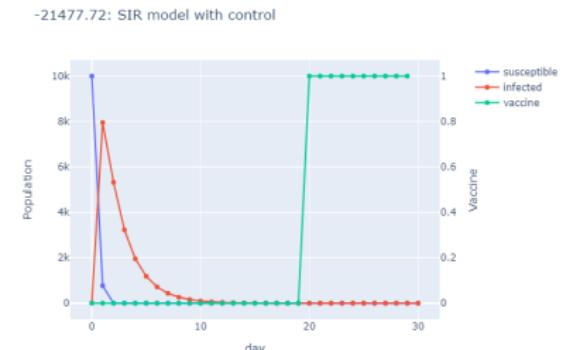
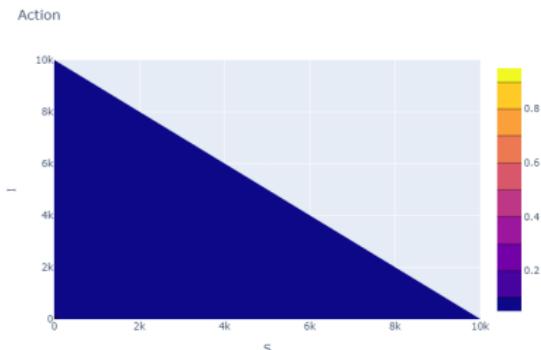
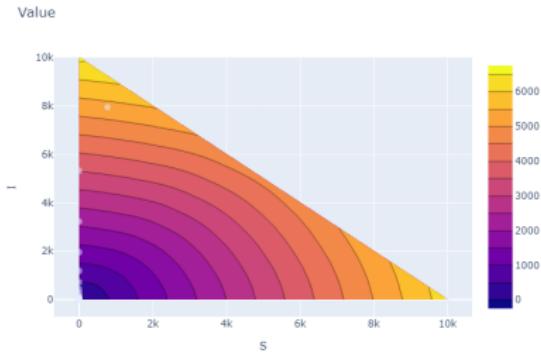
Case 4_ nu=0.2, beta=0.0010

After 6 episodes learning:



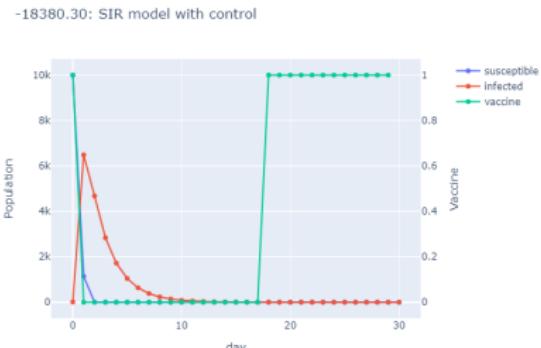
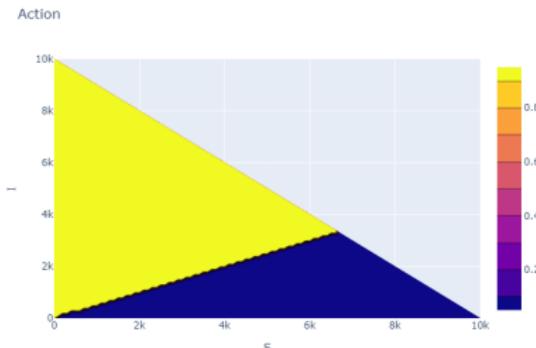
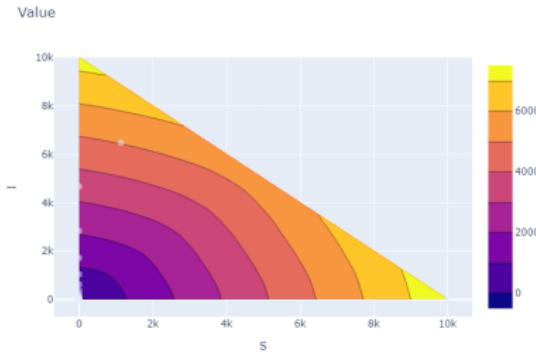
Case 4_ nu=0.2, beta=0.0010

After 7 episodes learning:



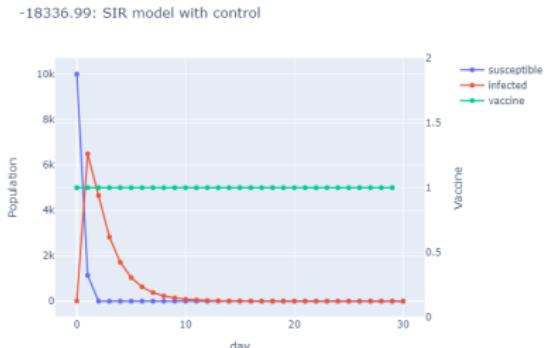
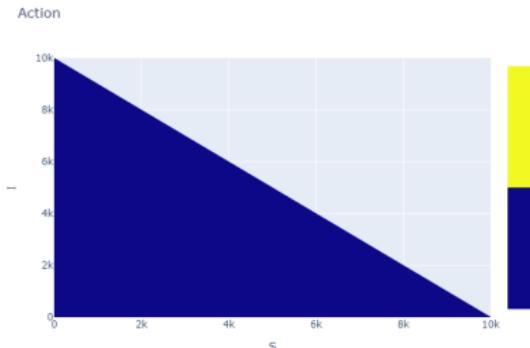
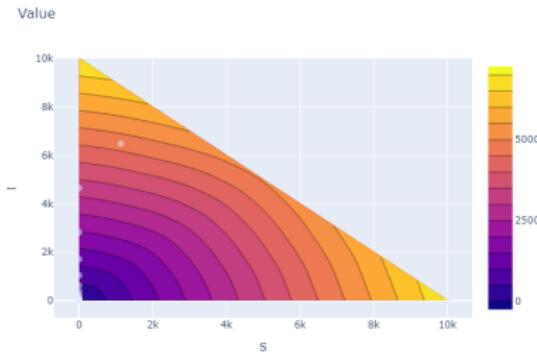
Case 4_ nu=0.2, beta=0.0010

After 8 episodes learning:



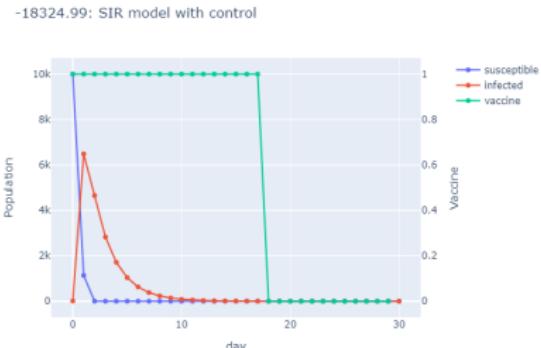
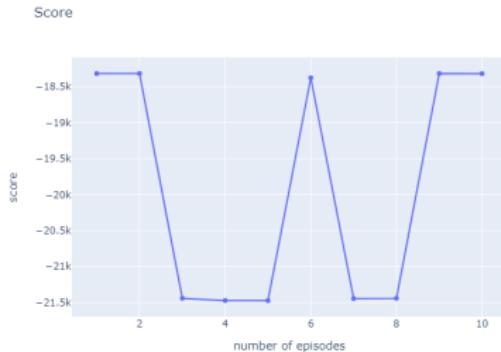
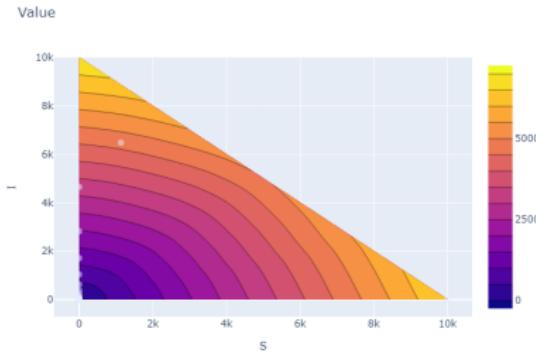
Case 4_ nu=0.2, beta=0.0010

After 9 episodes learning:



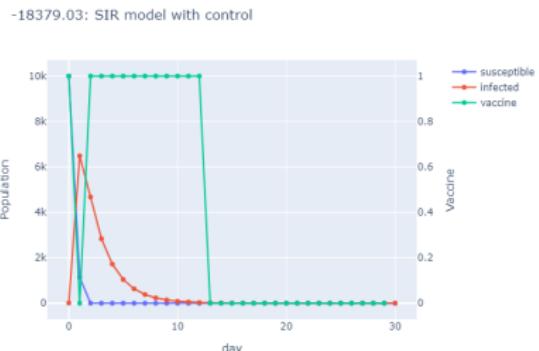
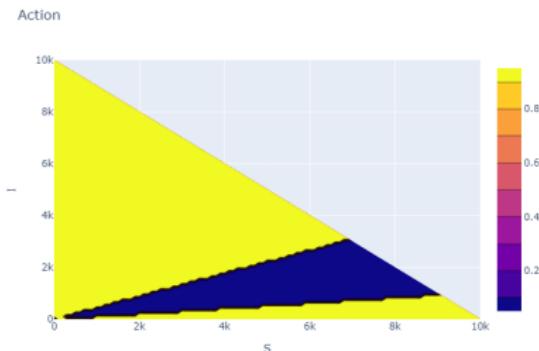
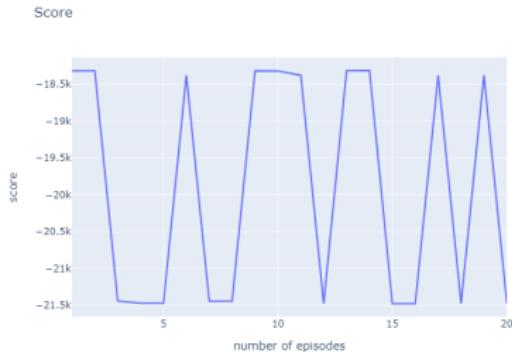
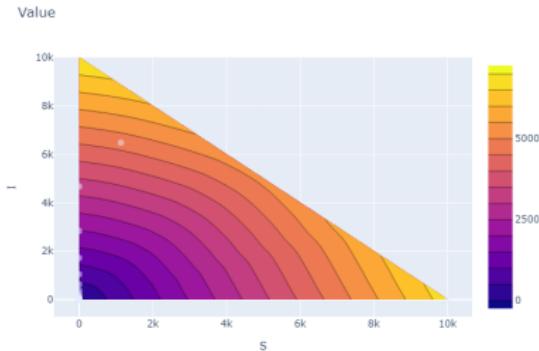
Case 4_ nu=0.2, beta=0.0010

After 10 episodes learning:



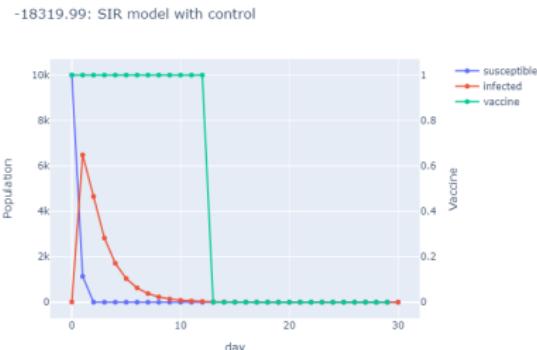
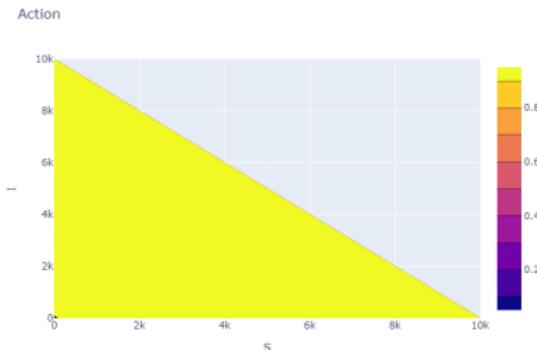
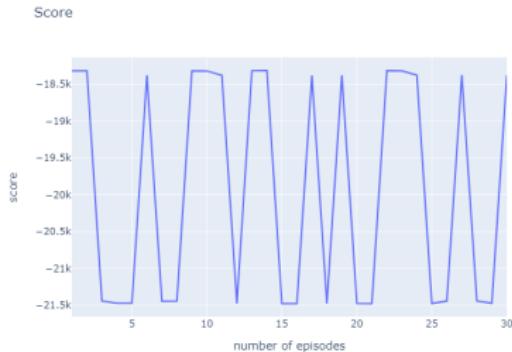
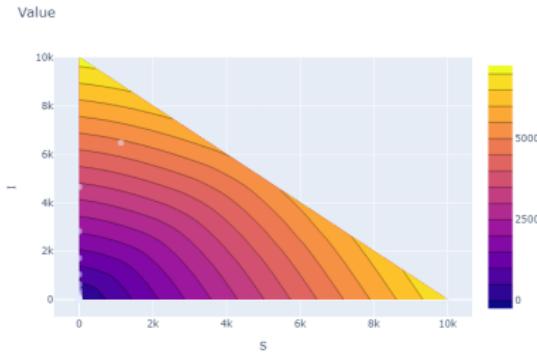
Case 4_ nu=0.2, beta=0.0010

After 20 episodes learning:



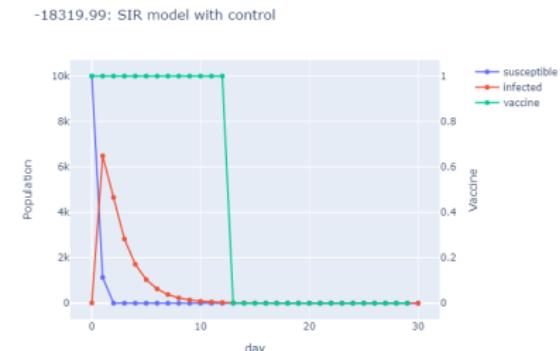
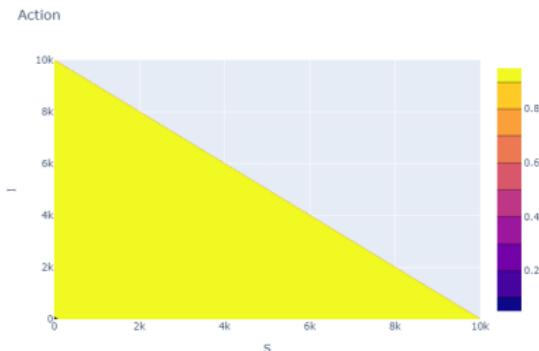
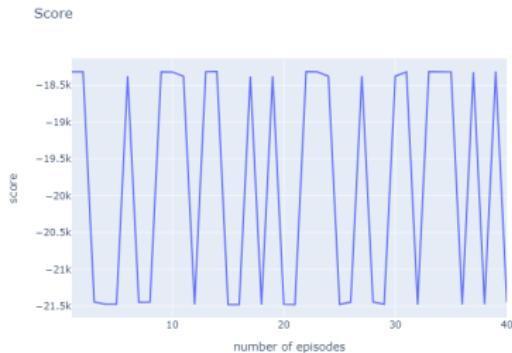
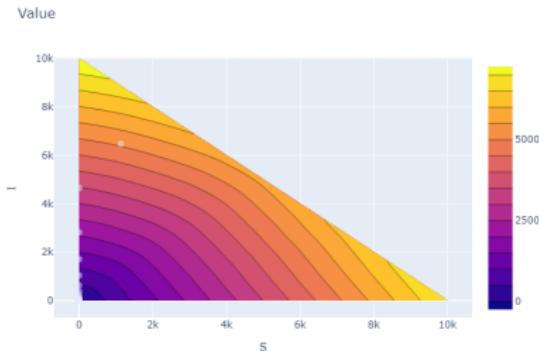
Case 4_ nu=0.2, beta=0.0010

After 30 episodes learning:



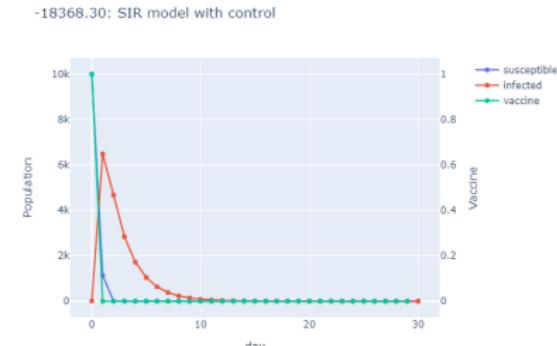
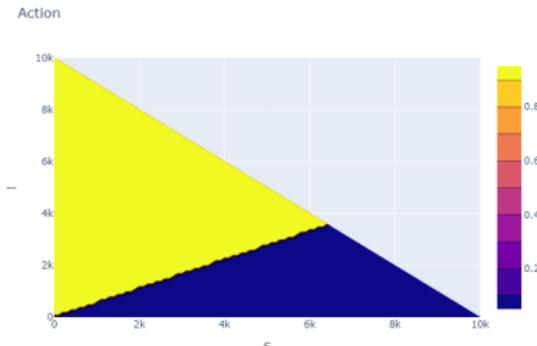
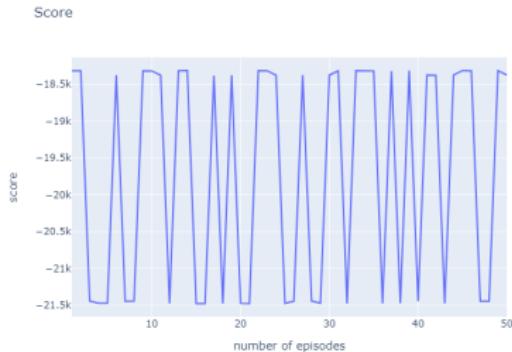
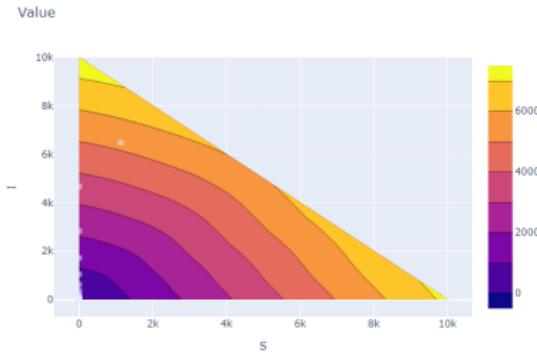
Case 4_ nu=0.2, beta=0.0010

After 40 episodes learning:



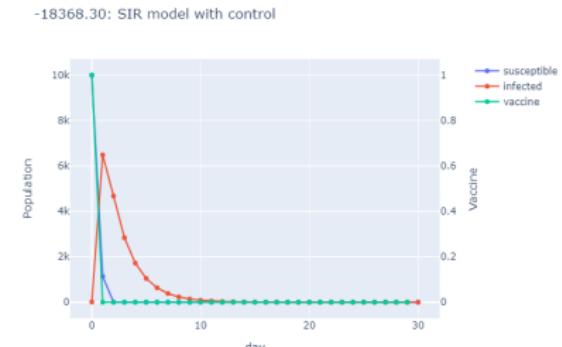
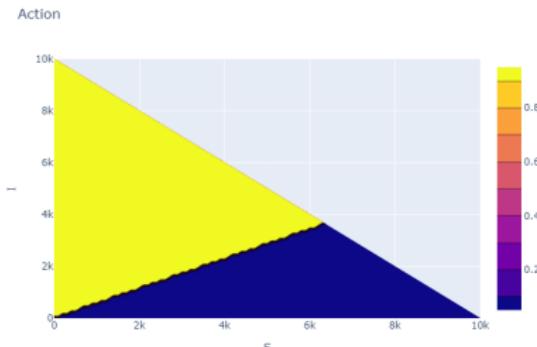
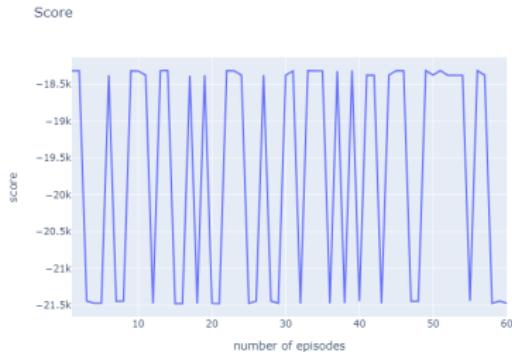
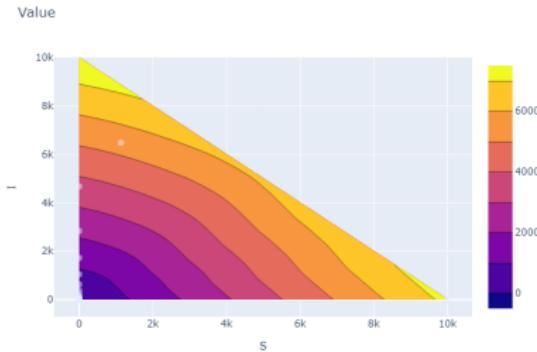
Case 4_ nu=0.2, beta=0.0010

After 50 episodes learning:



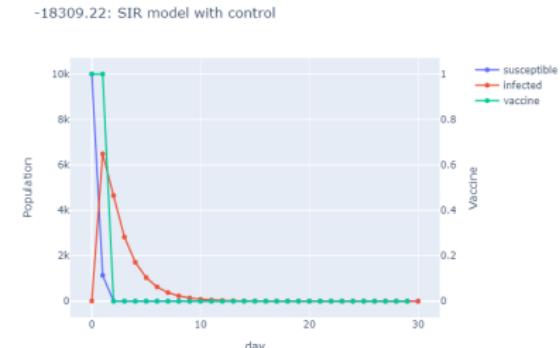
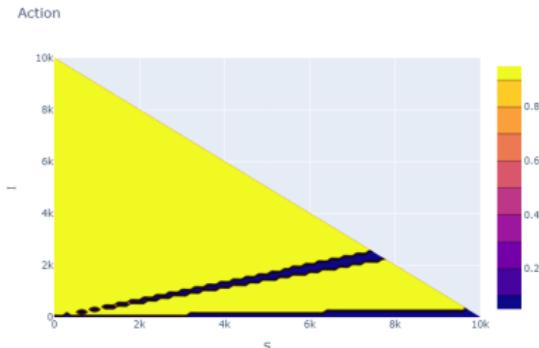
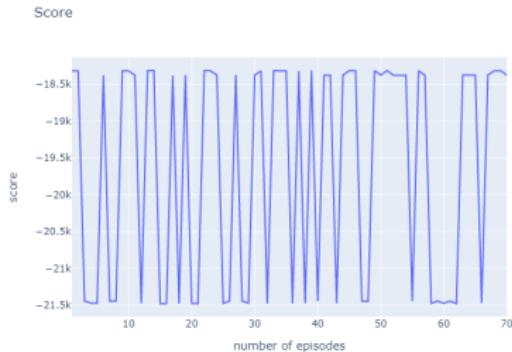
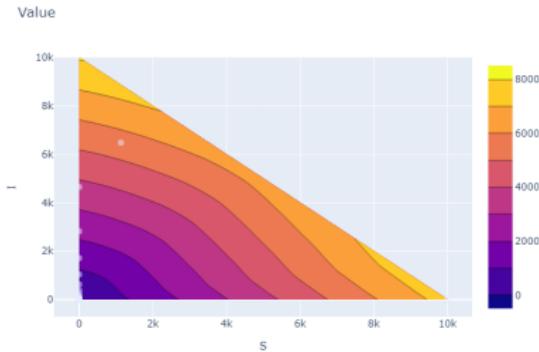
Case 4_ nu=0.2, beta=0.0010

After 60 episodes learning:



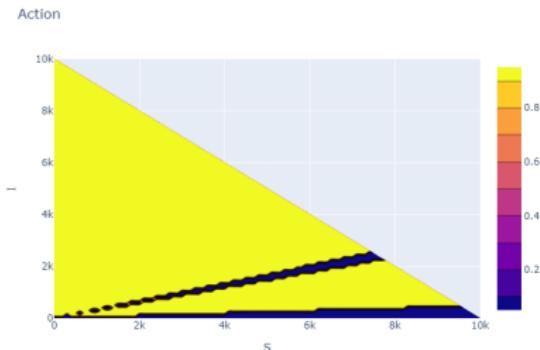
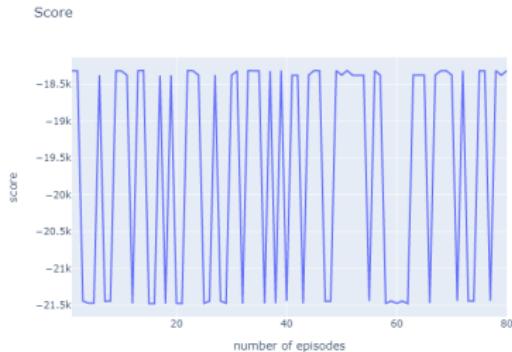
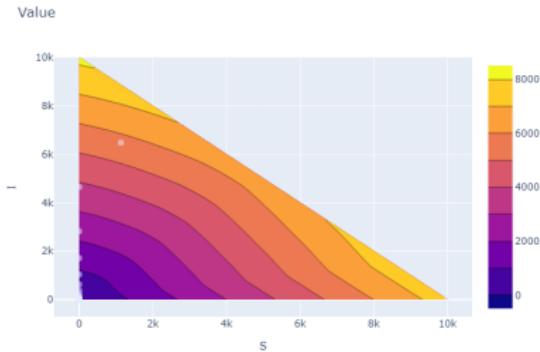
Case 4_ nu=0.2, beta=0.0010

After 70 episodes learning:



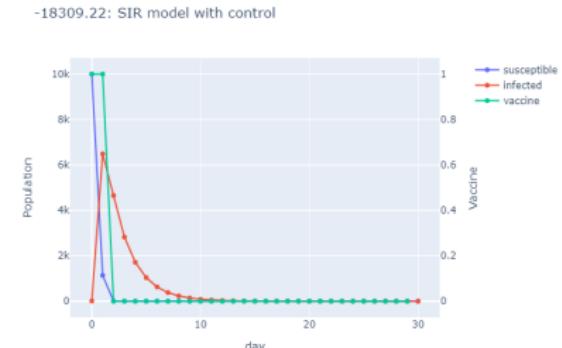
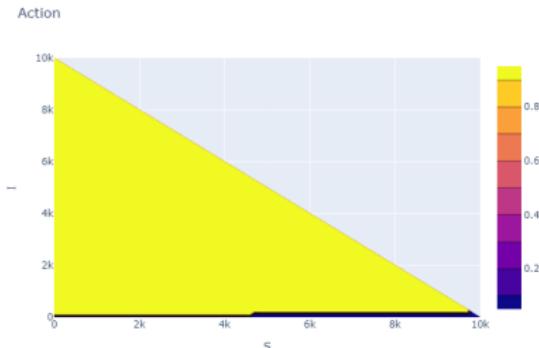
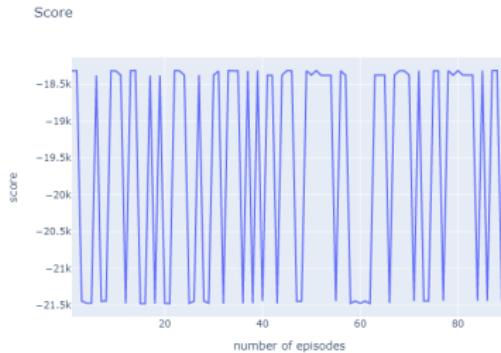
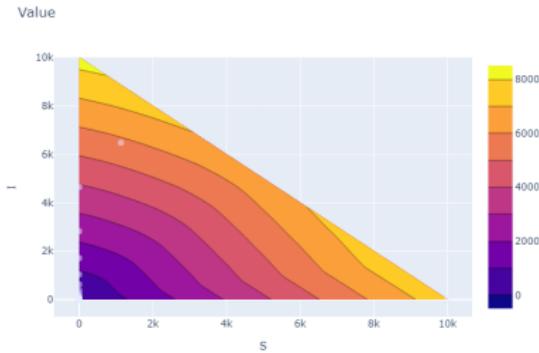
Case 4_ nu=0.2, beta=0.0010

After 80 episodes learning:



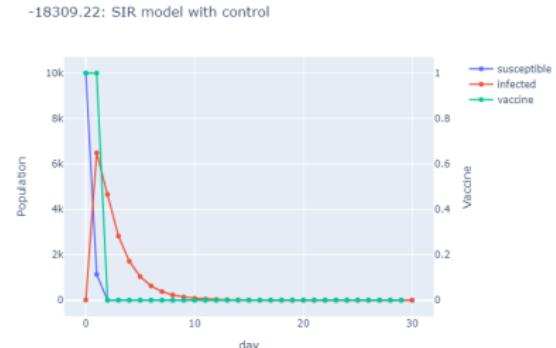
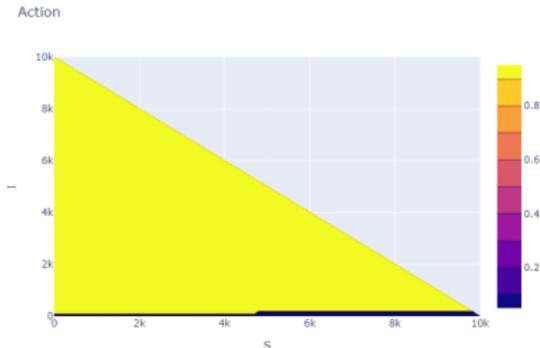
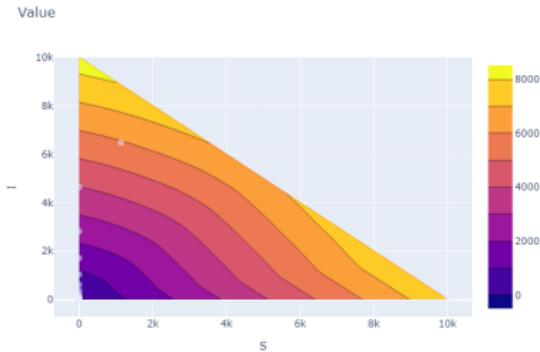
Case 4_ nu=0.2, beta=0.0010

After 90 episodes learning:



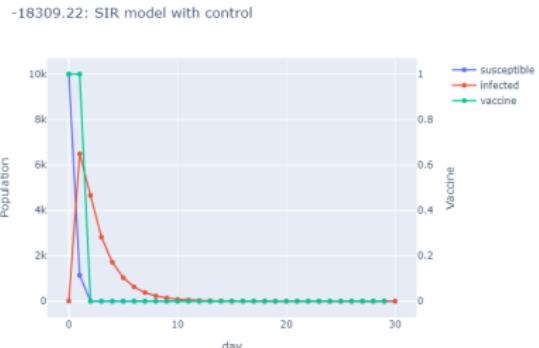
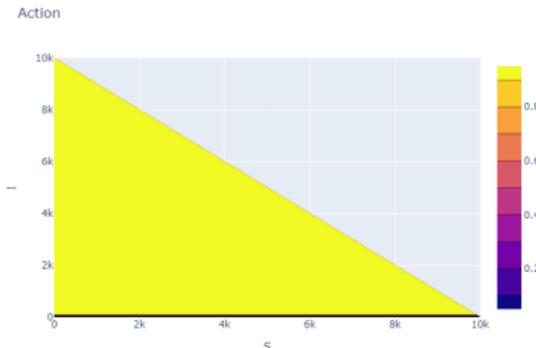
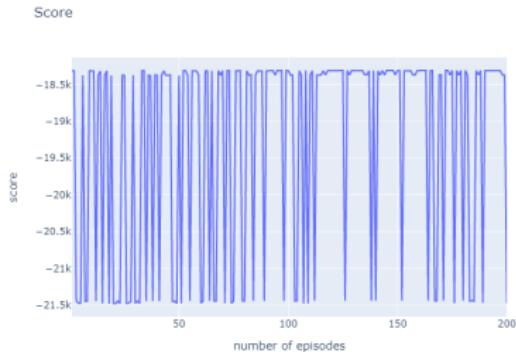
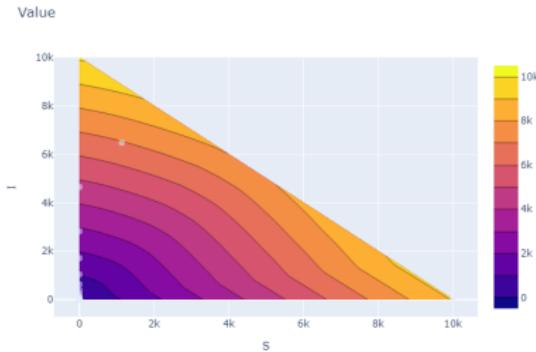
Case 4_ nu=0.2, beta=0.0010

After 100 episodes learning:



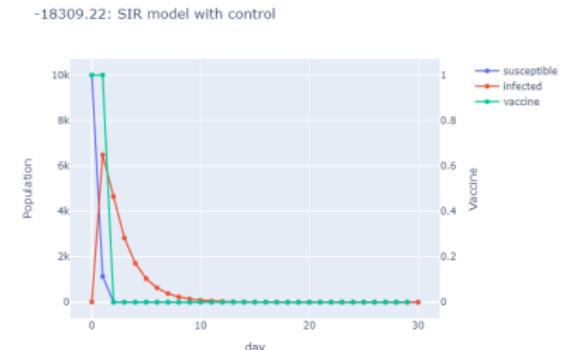
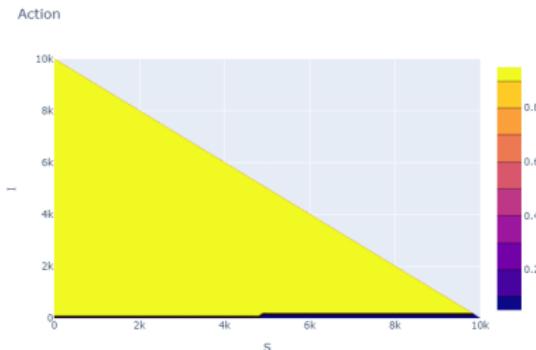
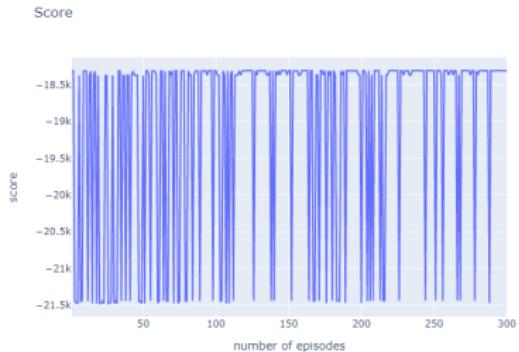
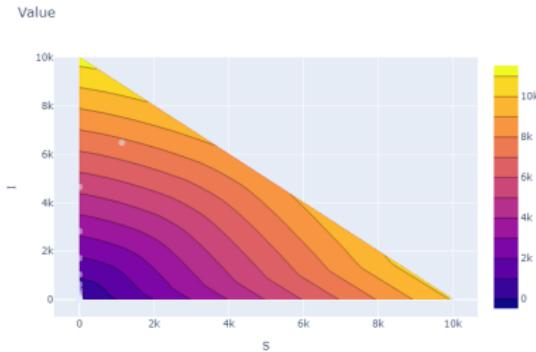
Case 4_ nu=0.2, beta=0.0010

After 200 episodes learning:



Case 4_ nu=0.2, beta=0.0010

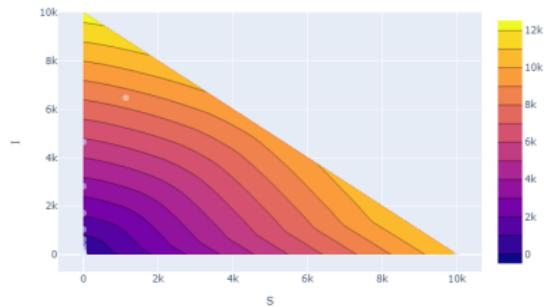
After 300 episodes learning:



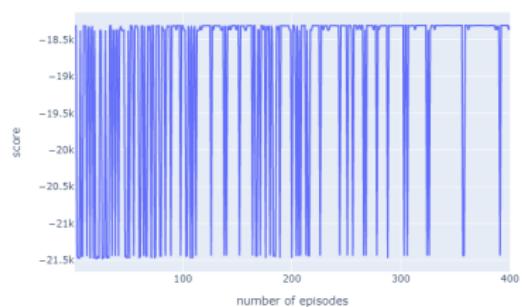
Case 4_ nu=0.2, beta=0.0010

After 400 episodes learning:

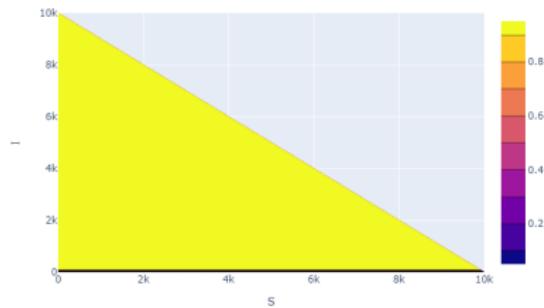
Value



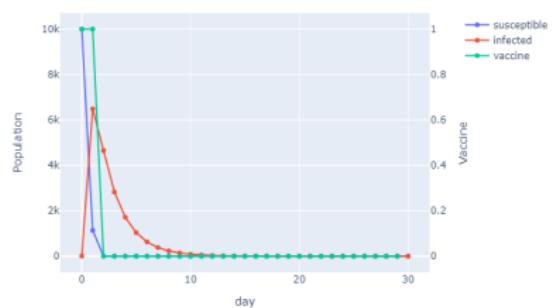
Score



Action

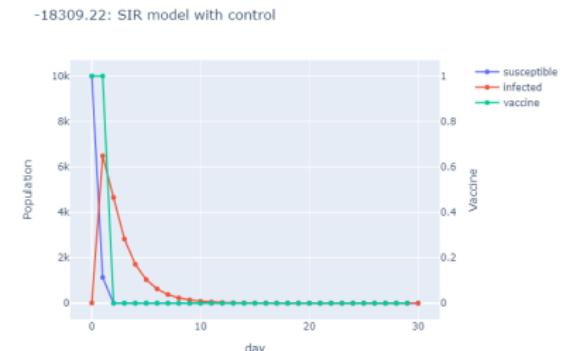
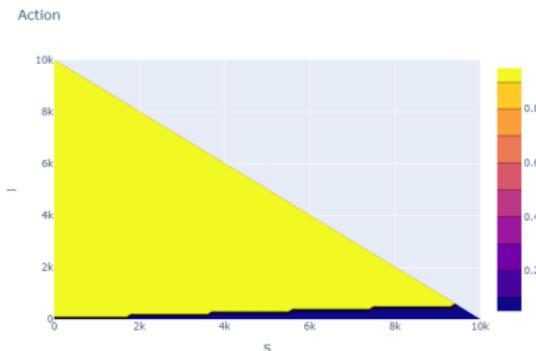
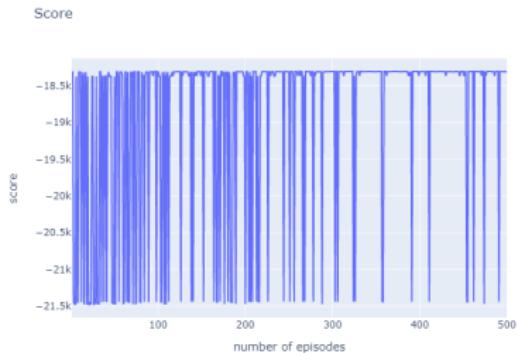
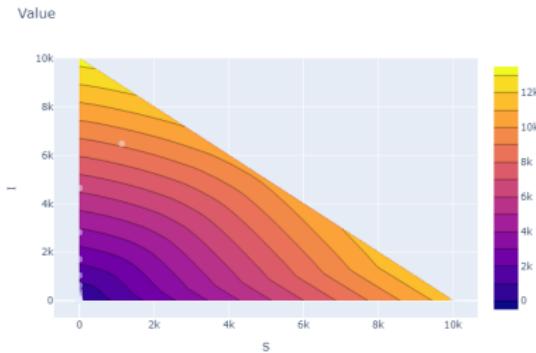


-18309.22: SIR model with control



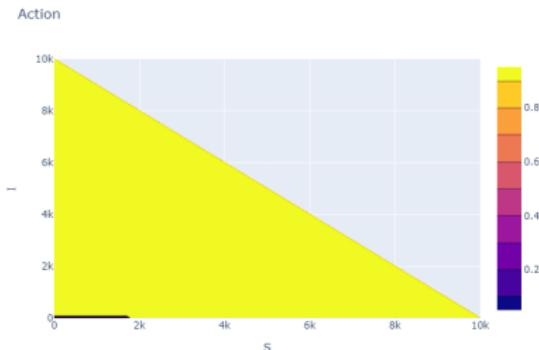
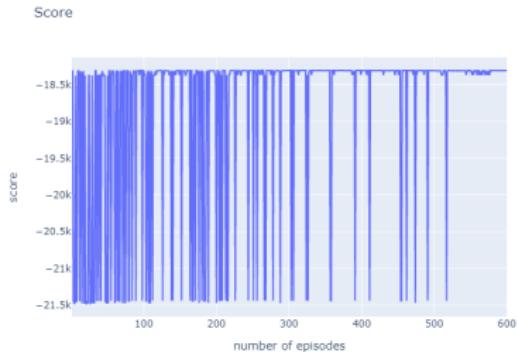
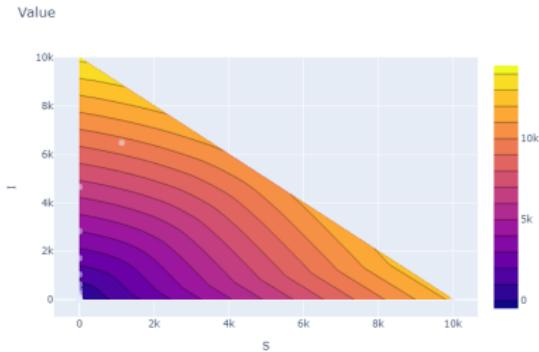
Case 4_ nu=0.2, beta=0.0010

After 500 episodes learning:



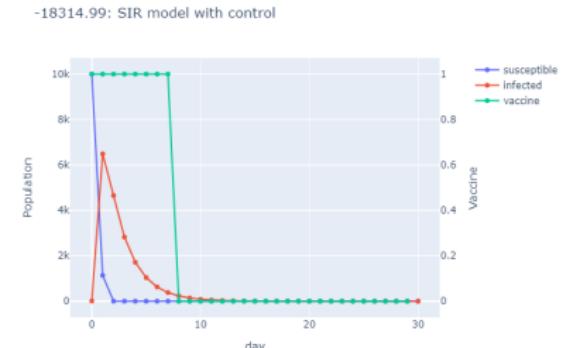
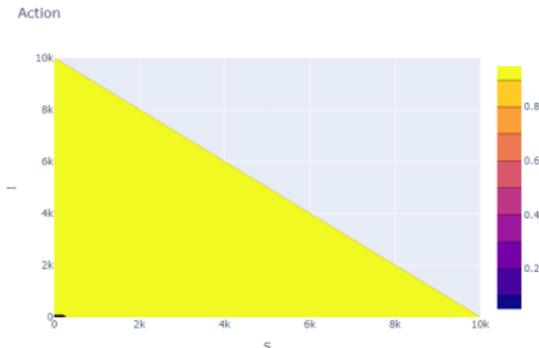
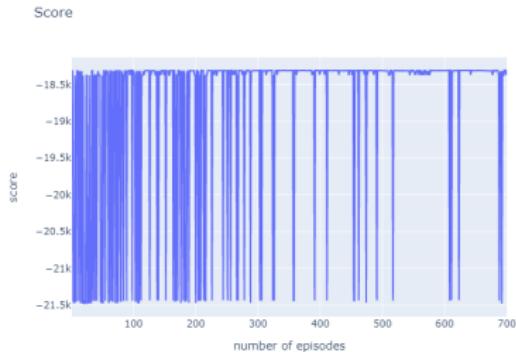
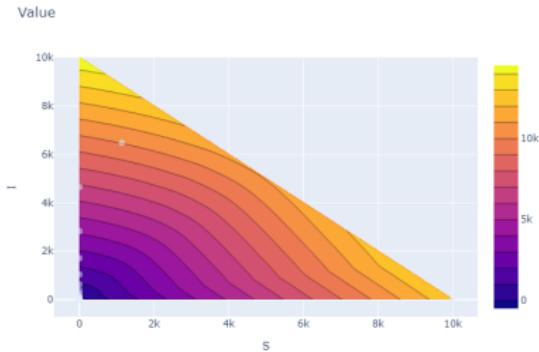
Case 4_ nu=0.2, beta=0.0010

After 600 episodes learning:



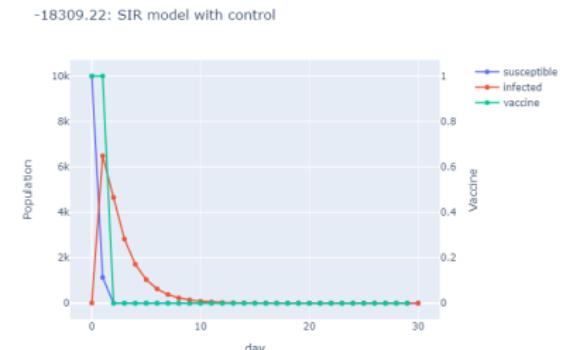
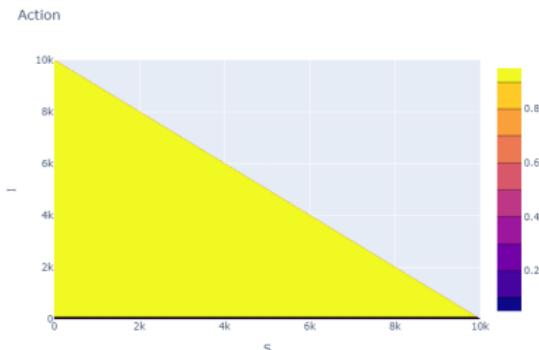
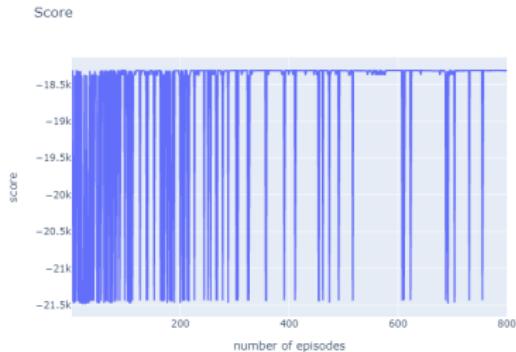
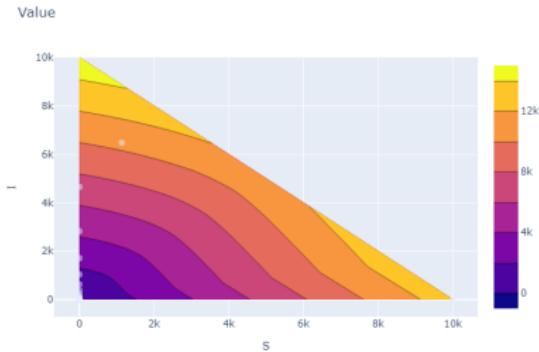
Case 4_ nu=0.2, beta=0.0010

After 700 episodes learning:



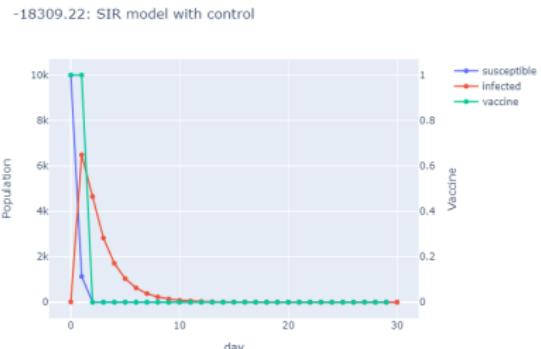
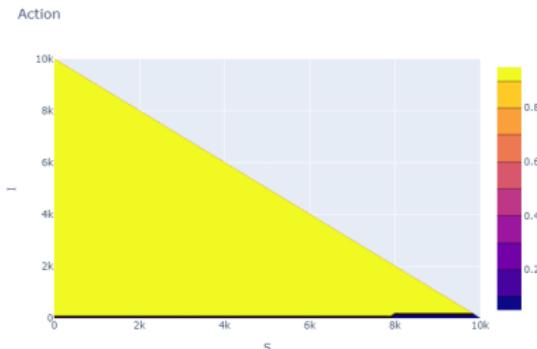
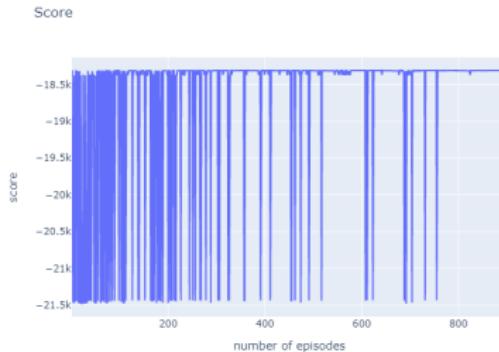
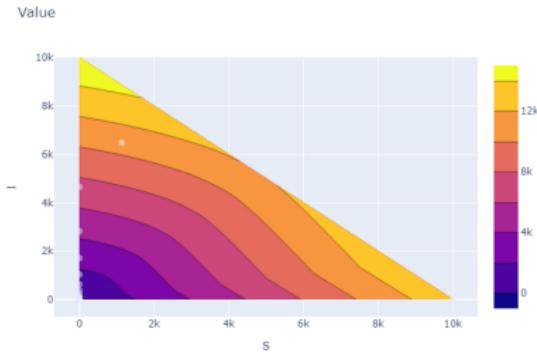
Case 4_ nu=0.2, beta=0.0010

After 800 episodes learning:



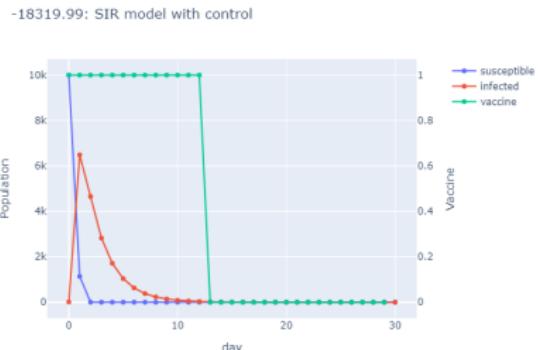
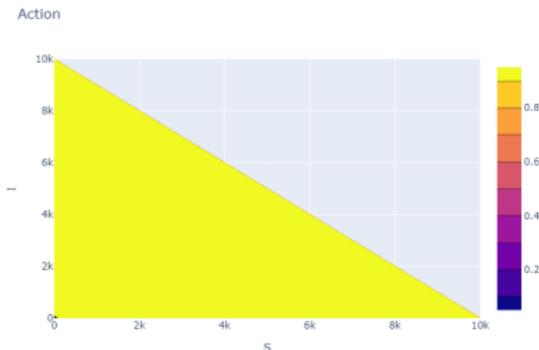
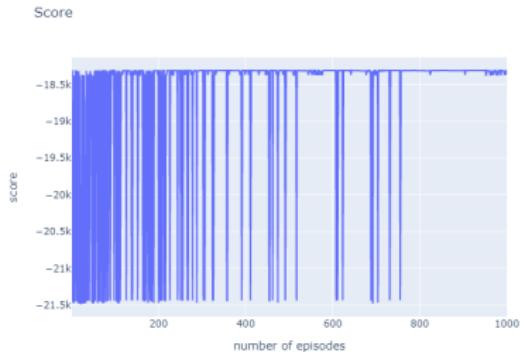
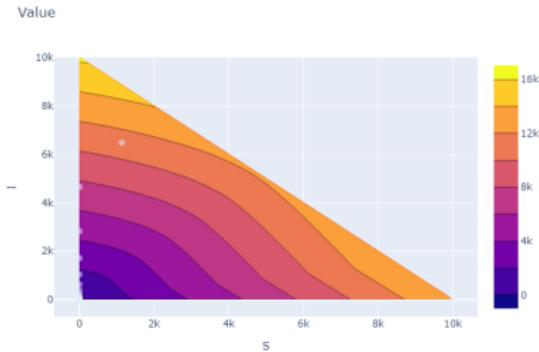
Case 4_ nu=0.2, beta=0.0010

After 900 episodes learning:



Case 4_ nu=0.2, beta=0.0010

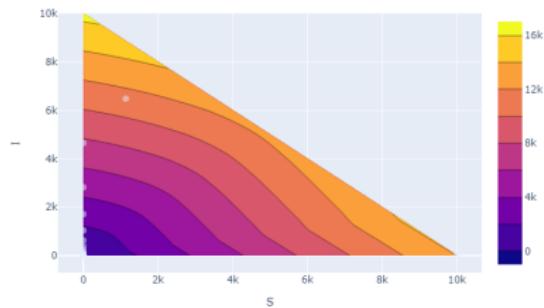
After 1000 episodes learning:



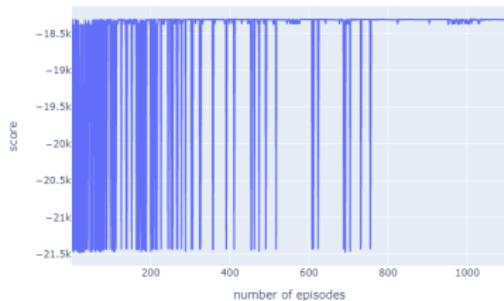
Case 4_ nu=0.2, beta=0.0010

After 1100 episodes learning:

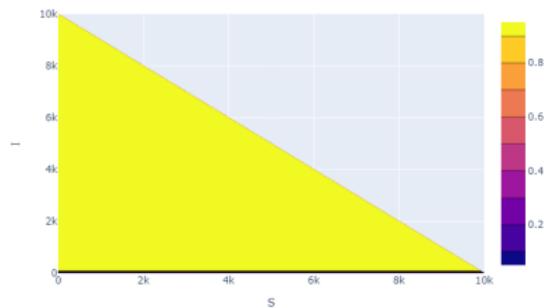
Value



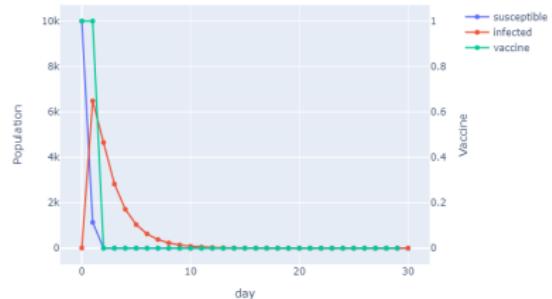
Score



Action

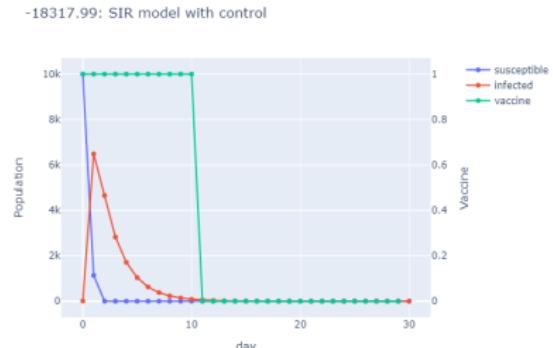
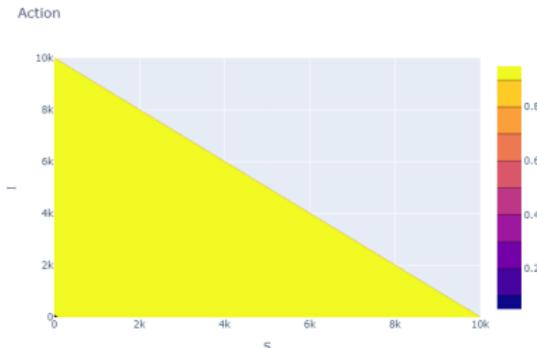
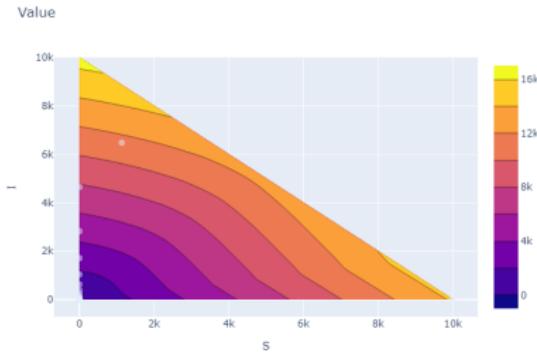


-18309.22: SIR model with control



Case 4_ nu=0.2, beta=0.0010

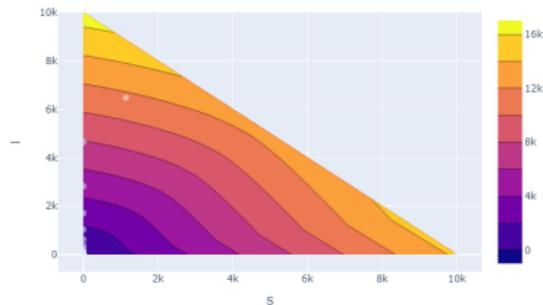
After 1200 episodes learning:



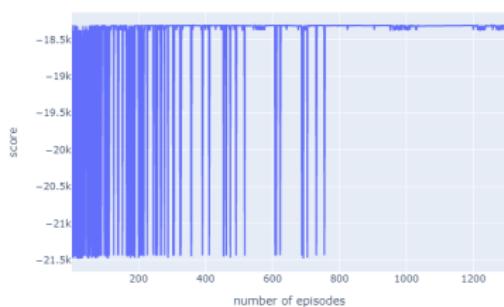
Case 4_ nu=0.2, beta=0.0010

After 1300 episodes learning:

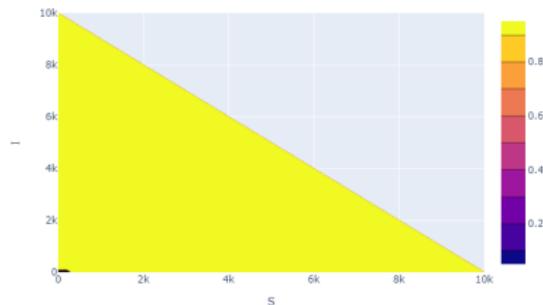
Value



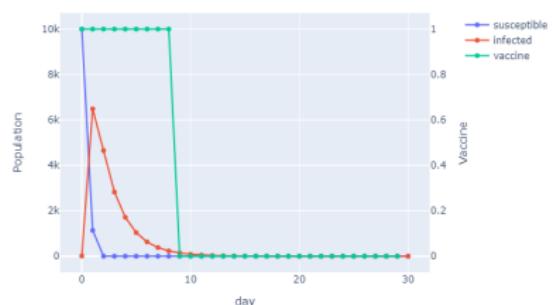
Score



Action

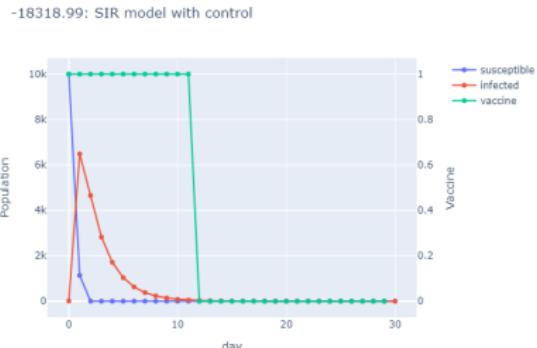
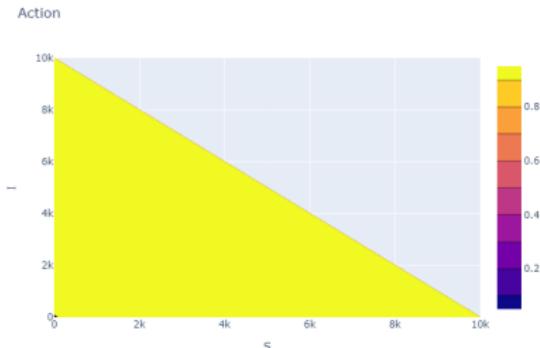
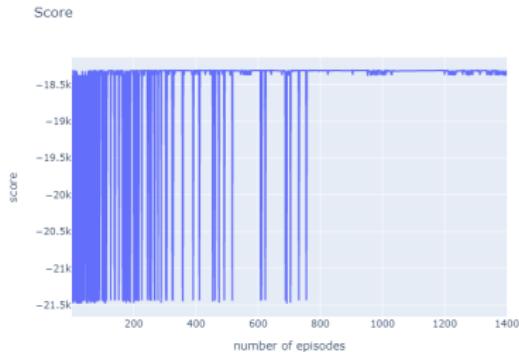
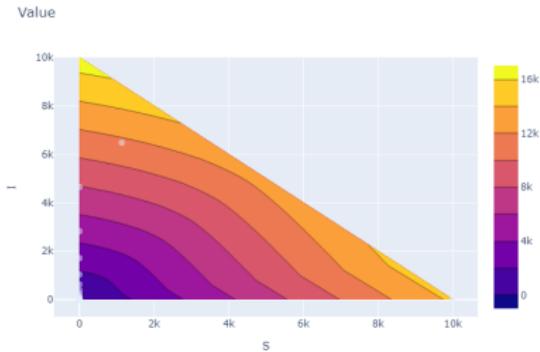


-18315.99: SIR model with control



Case 4_ nu=0.2, beta=0.0010

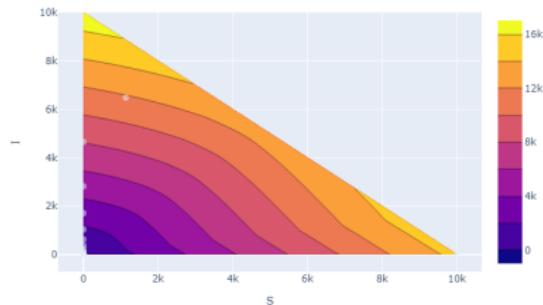
After 1400 episodes learning:



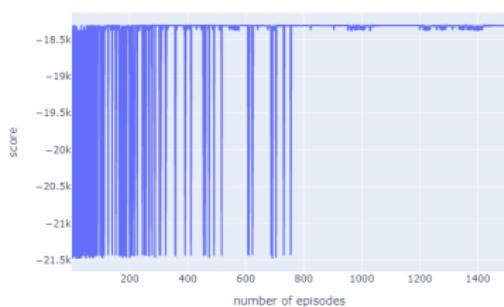
Case 4_ nu=0.2, beta=0.0010

After 1500 episodes learning:

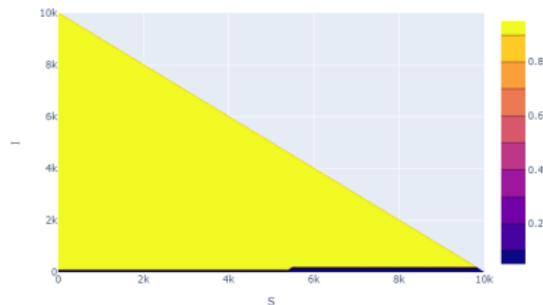
Value



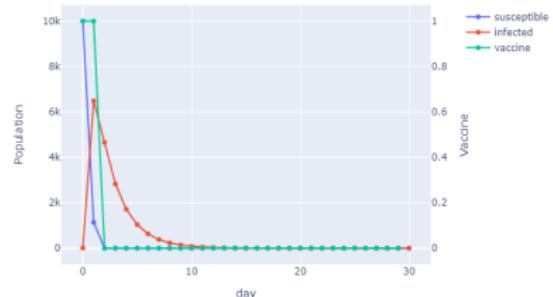
Score



Action

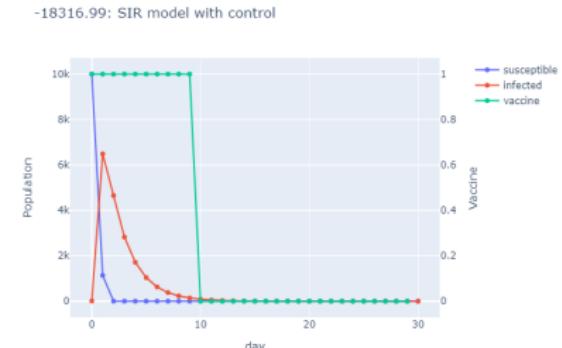
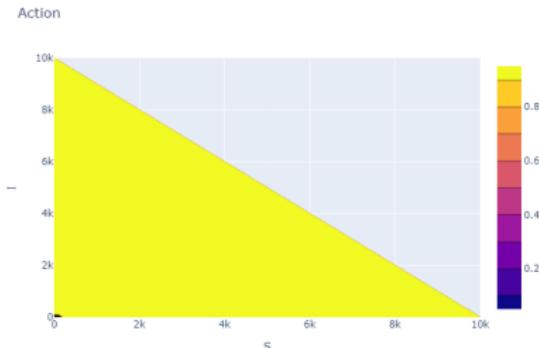
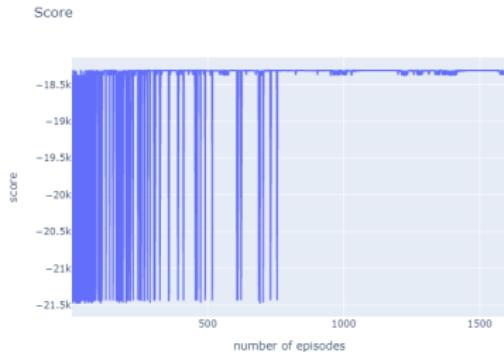
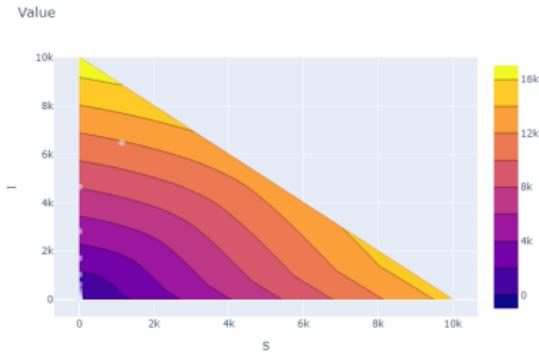


-18309.22: SIR model with control



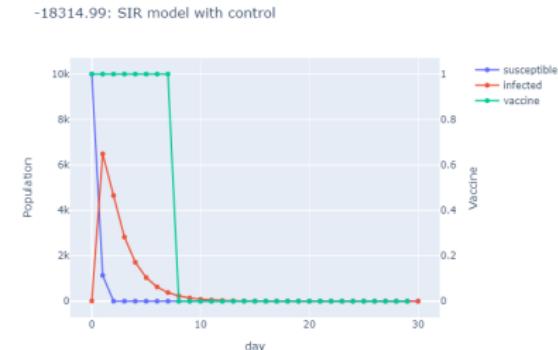
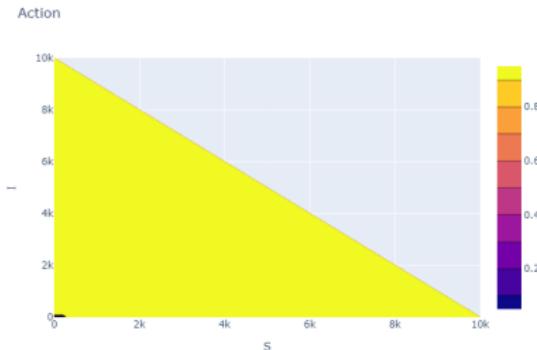
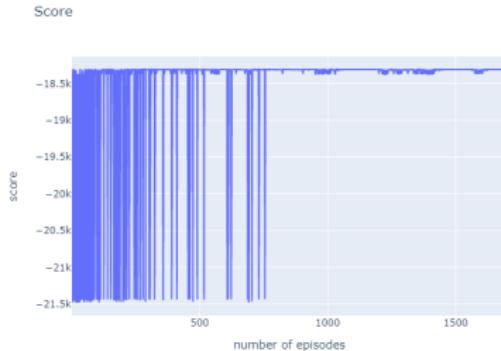
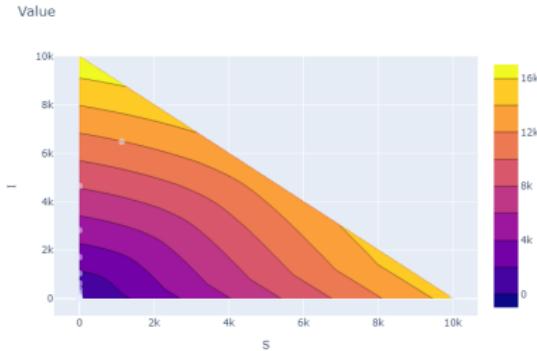
Case 4_ nu=0.2, beta=0.0010

After 1600 episodes learning:



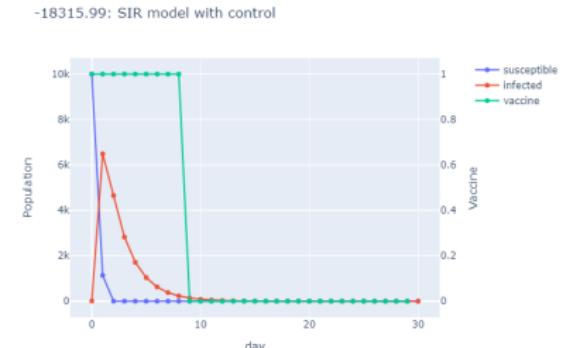
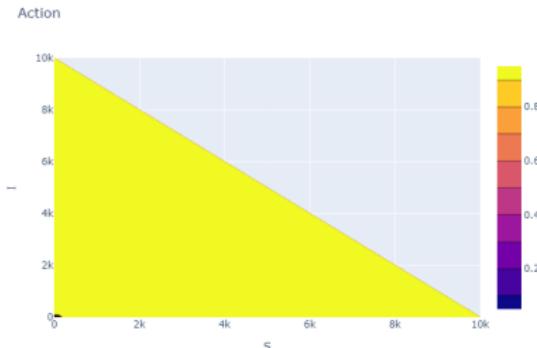
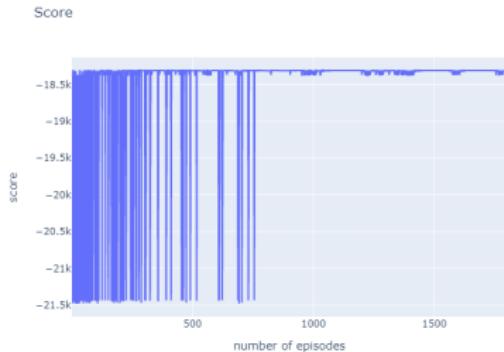
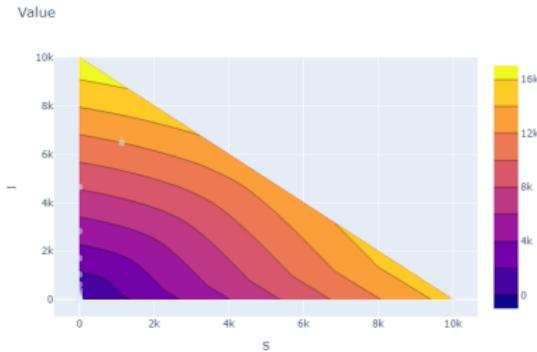
Case 4_ nu=0.2, beta=0.0010

After 1700 episodes learning:



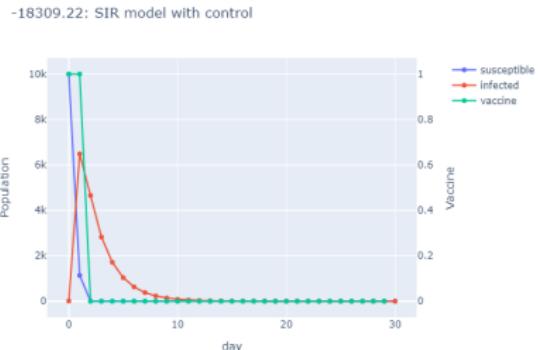
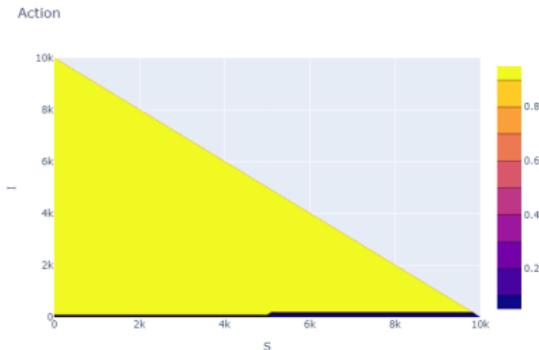
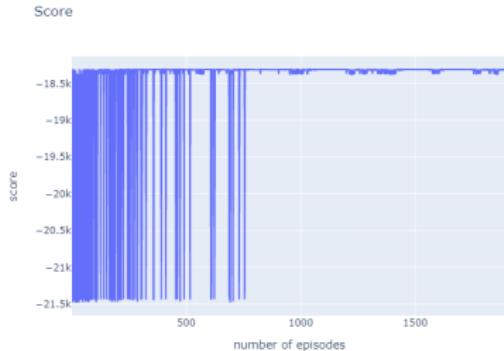
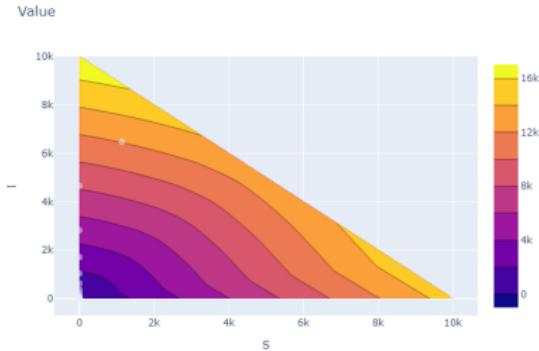
Case 4_ nu=0.2, beta=0.0010

After 1800 episodes learning:



Case 4_ nu=0.2, beta=0.0010

After 1900 episodes learning:



Case 4_ nu=0.2, beta=0.0010

After 2000 episodes learning:

