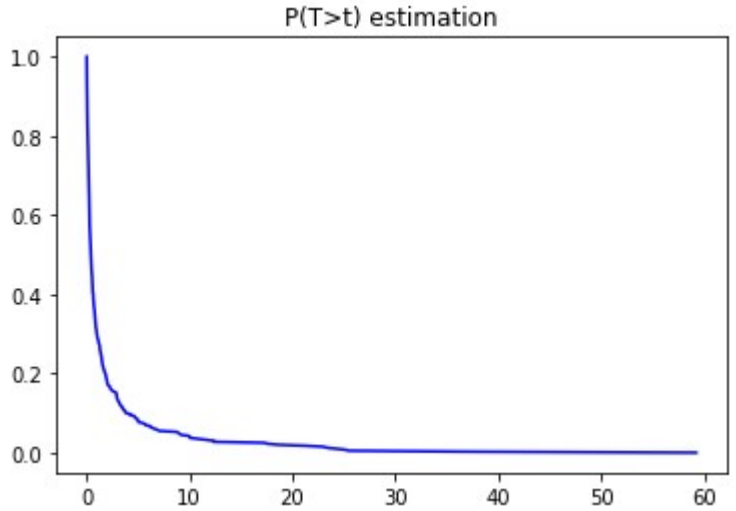
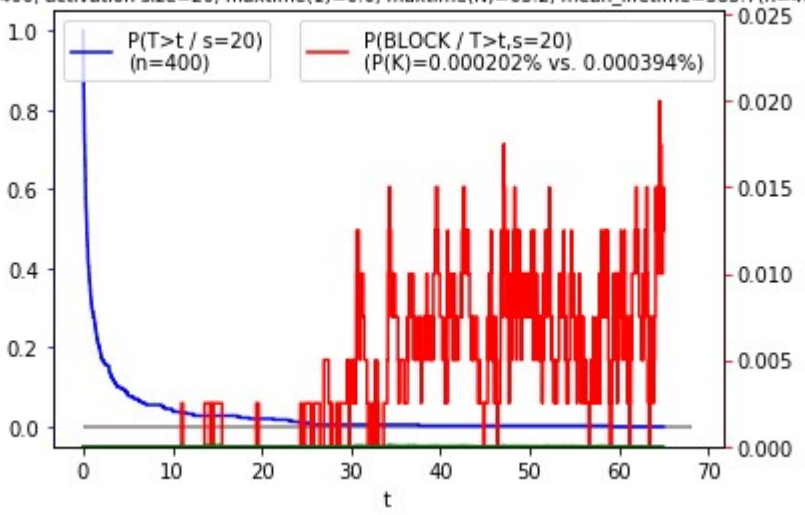
```
Python 3.6.4 |Anaconda custom (64-bit)| (default, Jan 16 2018, 10:22:32) [MSC v.1900 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 6.2.1 -- An enhanced Interactive Python.

Restarting kernel...
```

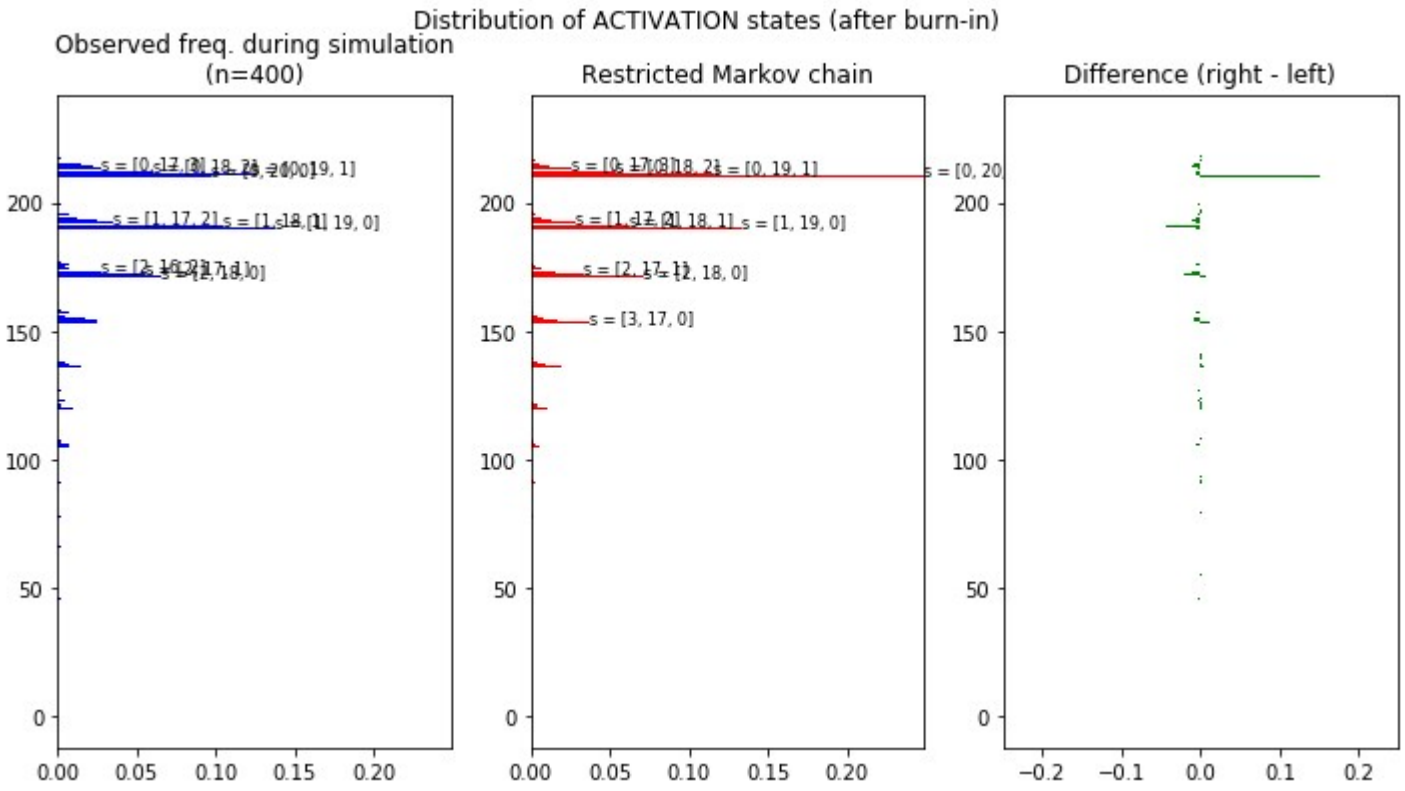
```
In [1]: runfile('E:/Daniel/Projects/PhD-RL-Toulouse/projects/Python/test/test_QB.py', wdir='E:/Daniel/Projects/PhD-RL-Toulouse/projects/Python/
test')
Directory:
E:\Daniel\Projects\PhD-RL-Toulouse\projects
has been prepended to the module search path.
Log file '../../RL-002-QueueBlocking/logs/test_fv_implementation_20210621_232641.log' has been open for output.
Started at: 2021-06-21 23:26:41
C:\ProgramData\Anaconda\Anaconda3\lib\site-packages\matplotlib\pyplot.py:528: RuntimeWarning: More than 20 figures have been opened. Figures created
through the pyplot interface (`matplotlib.pyplot.figure`) are retained until explicitly closed and may consume too much memory. (To control this
warning, see the rcParam `figure.max_open_warning`).
  max_open_warning, RuntimeWarning)
Ended at: 2021-06-22 22:57:19
Execution time: 1410.6 min, 23.5 hours
```

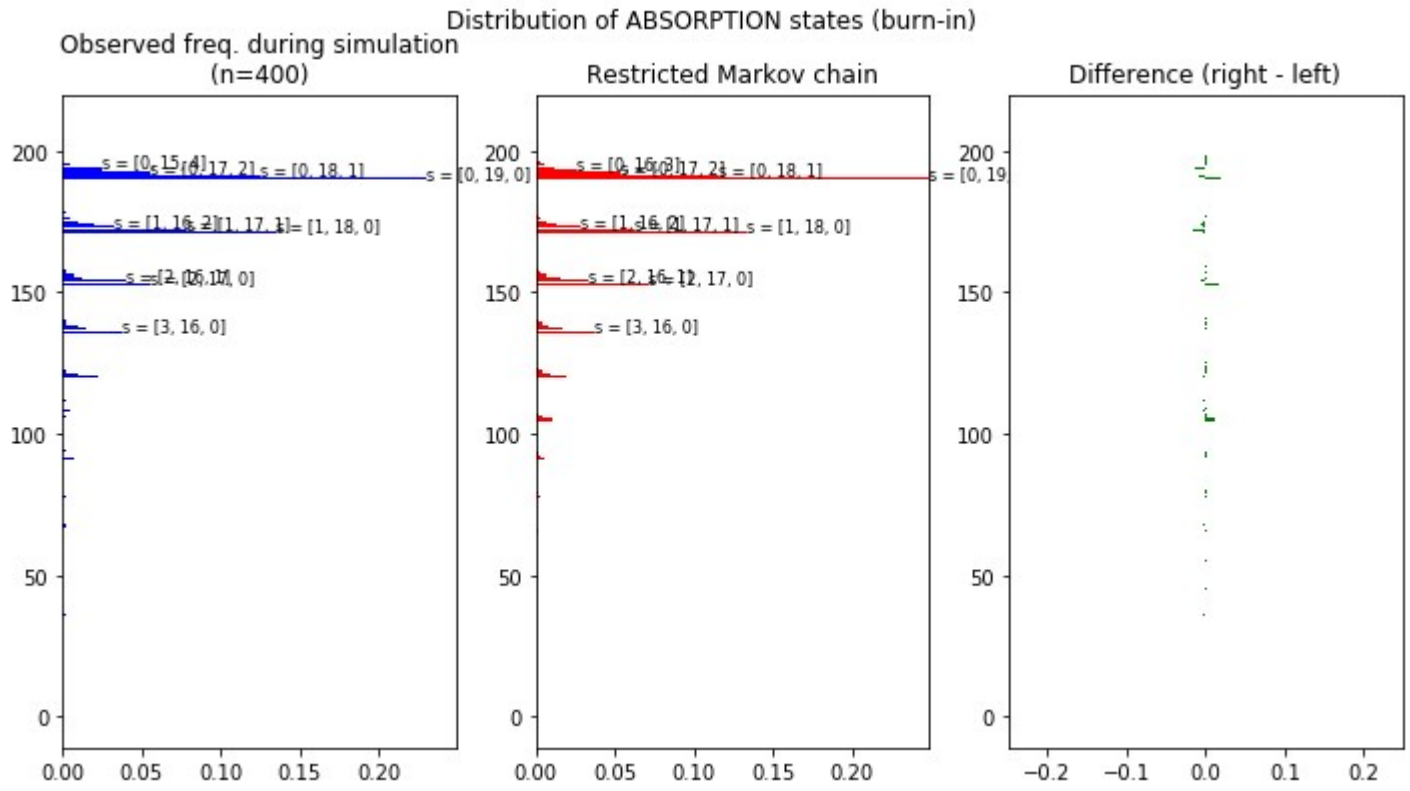


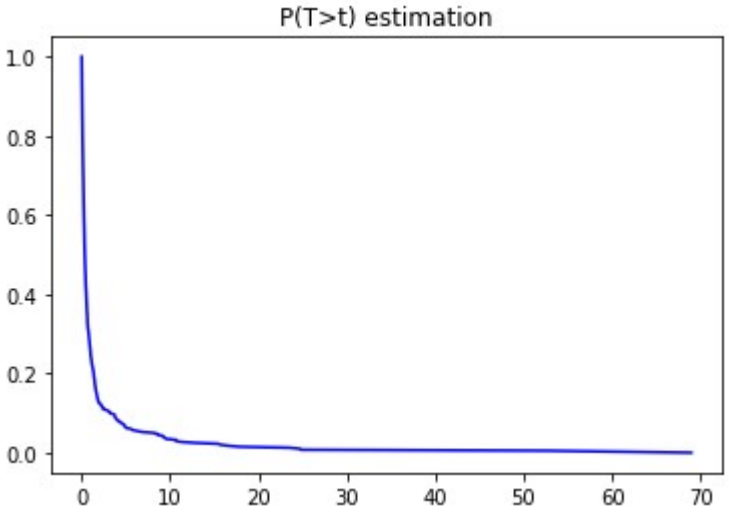
K=40, rhos=[0.4, 0.75, 0.35], N=400, activation size=20, maxtime(1)=0.0, maxtime(N)=65.2, mean_lifetime=385.7(n=400), finalize=ABS, seed=1717



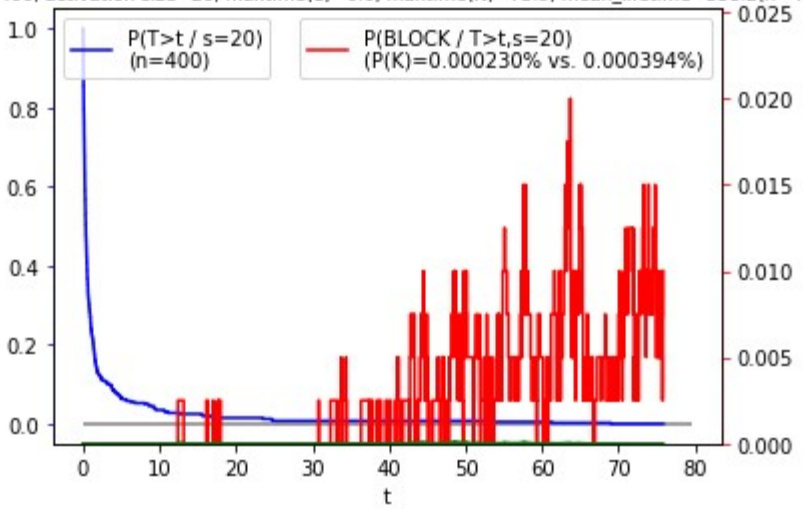
<matplotlib.figure.Figure at 0x2773020b080>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

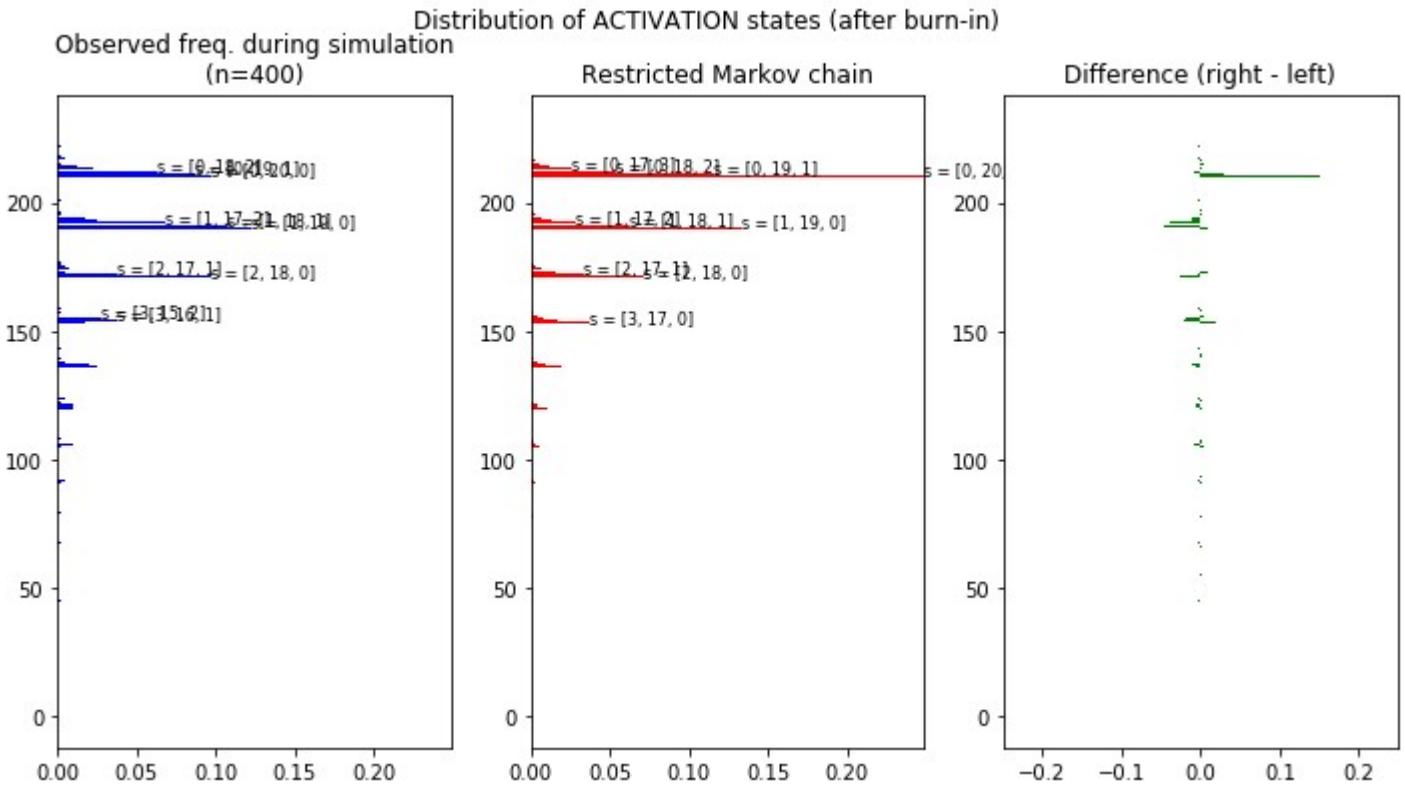

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 0]
s = [0, 18, 1]
s = [1, 18, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

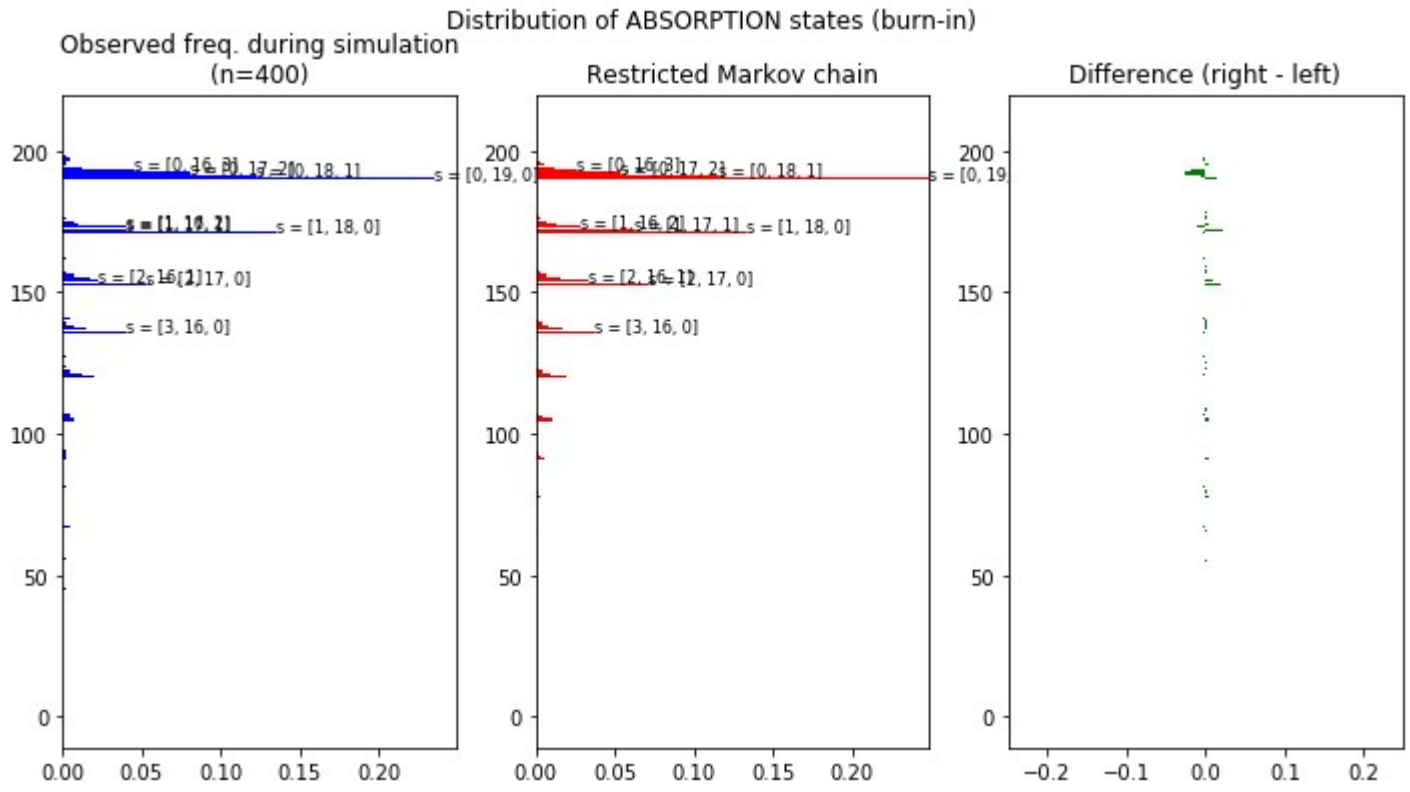


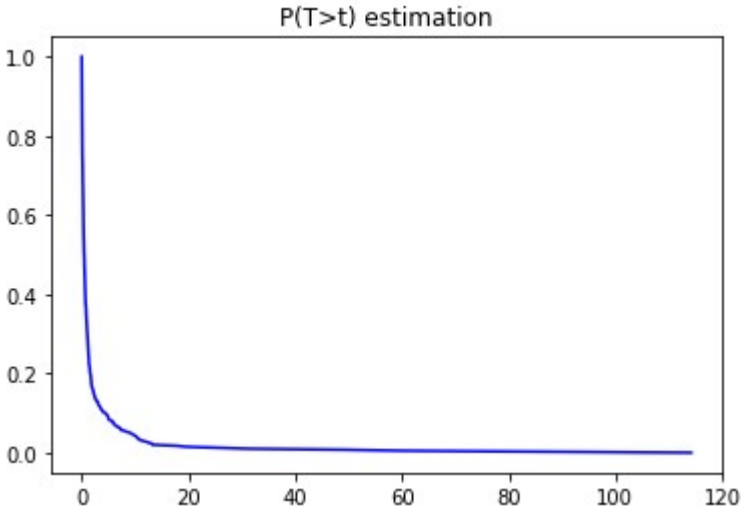
K=40, rhos=[0.4, 0.75, 0.35], N=400, activation size=20, maxtime(1)=0.0, maxtime(N)=75.9, mean_lifetime=358.2(n=400), finalize=ABS, seed=1727



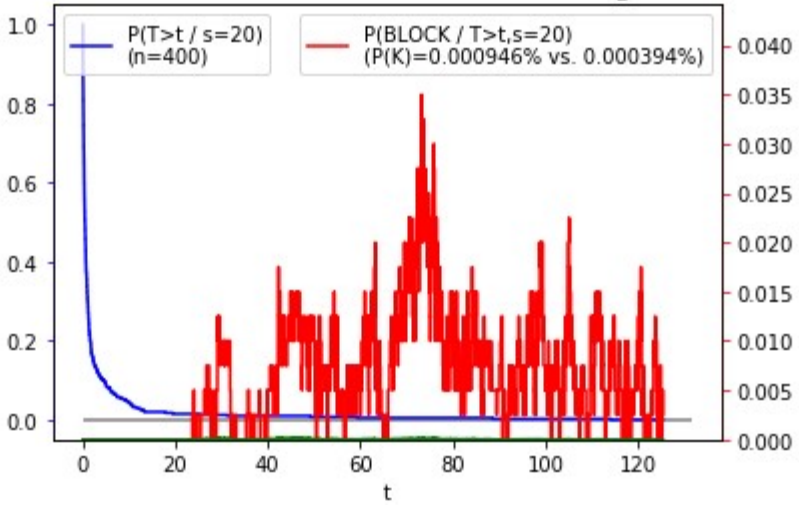
<matplotlib.figure.Figure at 0x277460e1710>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [2, 18, 0]
s = [3, 17, 0]
s = [1, 19, 0]
s = [0, 19, 1]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

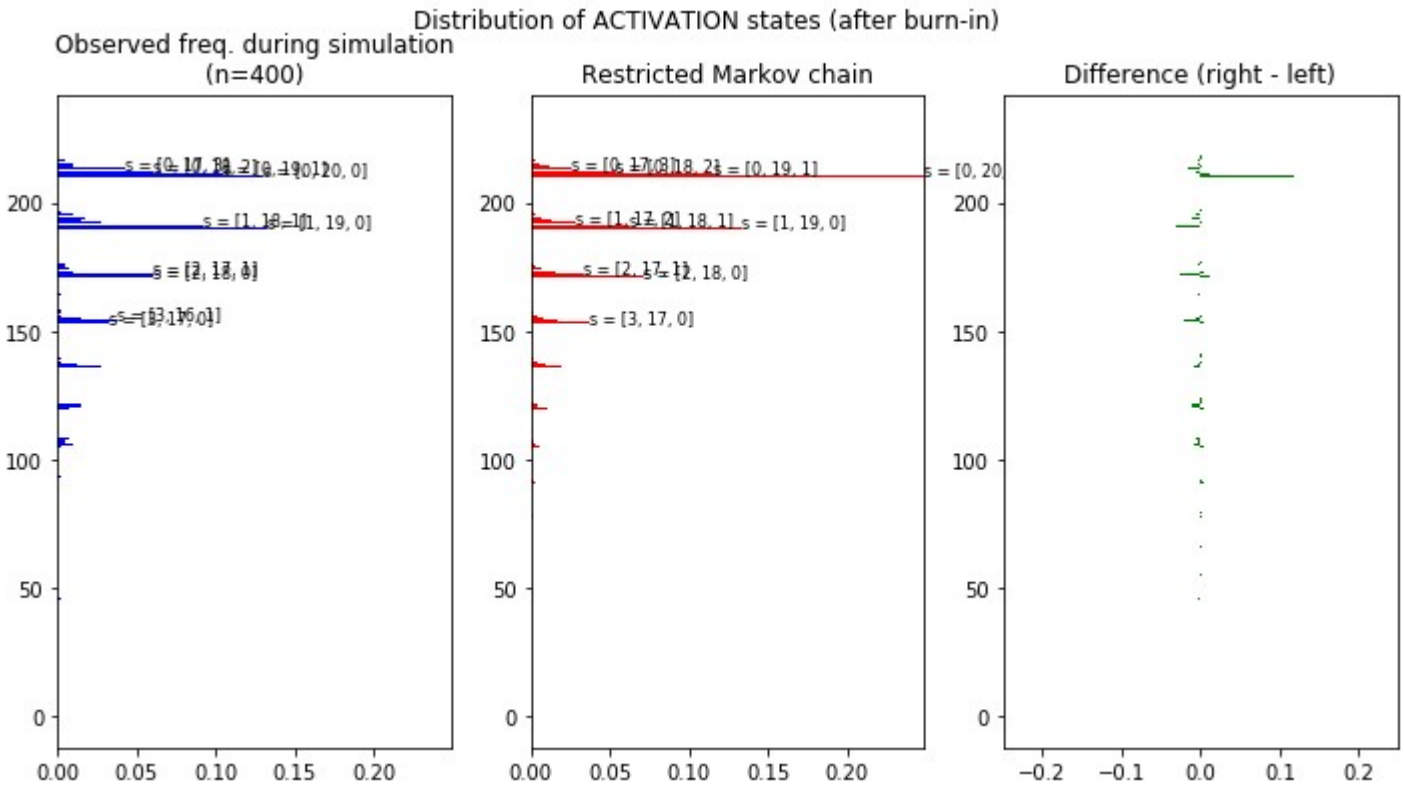

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [1, 18, 0]
s = [3, 16, 0]
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2
0
50
100
150
200

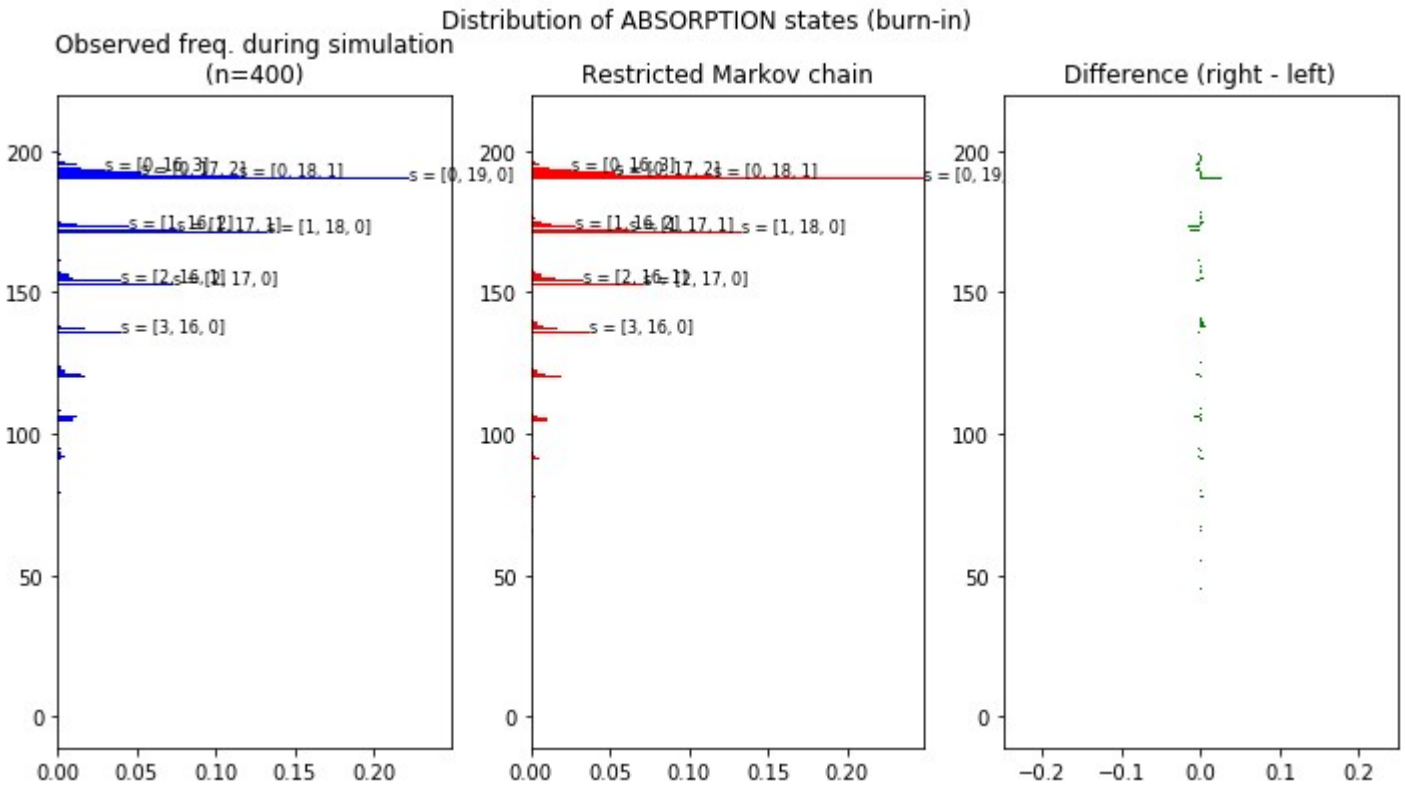


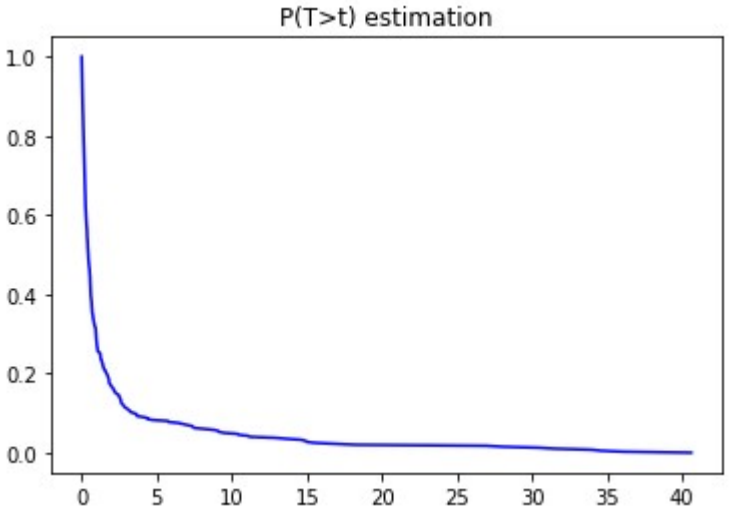
K=40, rhos=[0.4, 0.75, 0.35], N=400, activation size=20, maxtime(1)=0.0, maxtime(N)=125.6, mean_lifetime=433.1(n=400), finalize=ABS, seed=1737



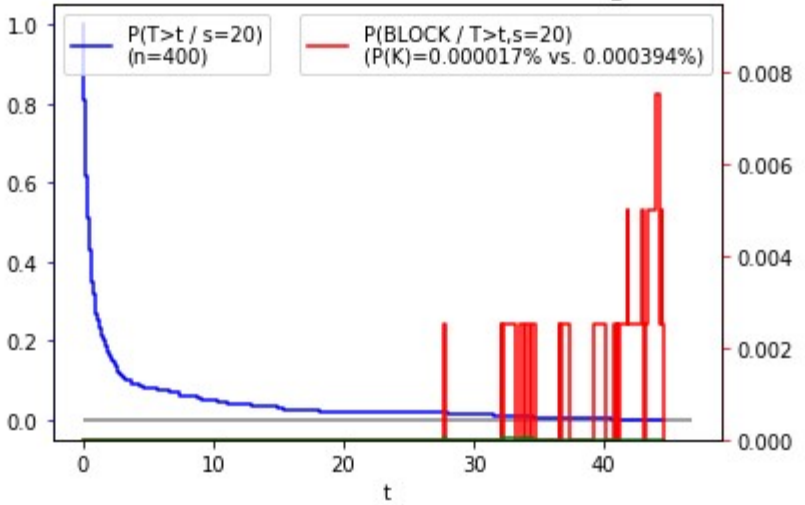
<matplotlib.figure.Figure at 0x27733c08320>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

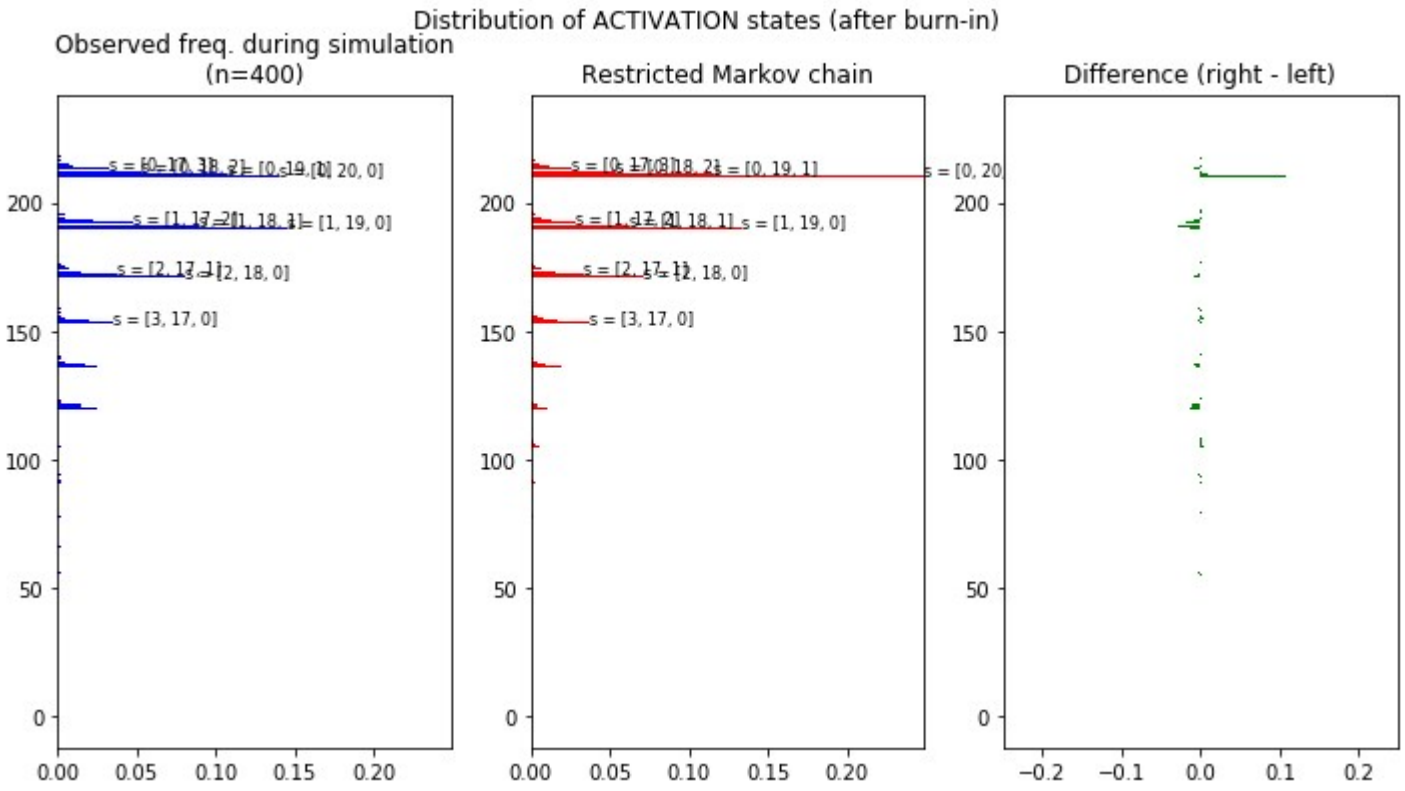

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 0]
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

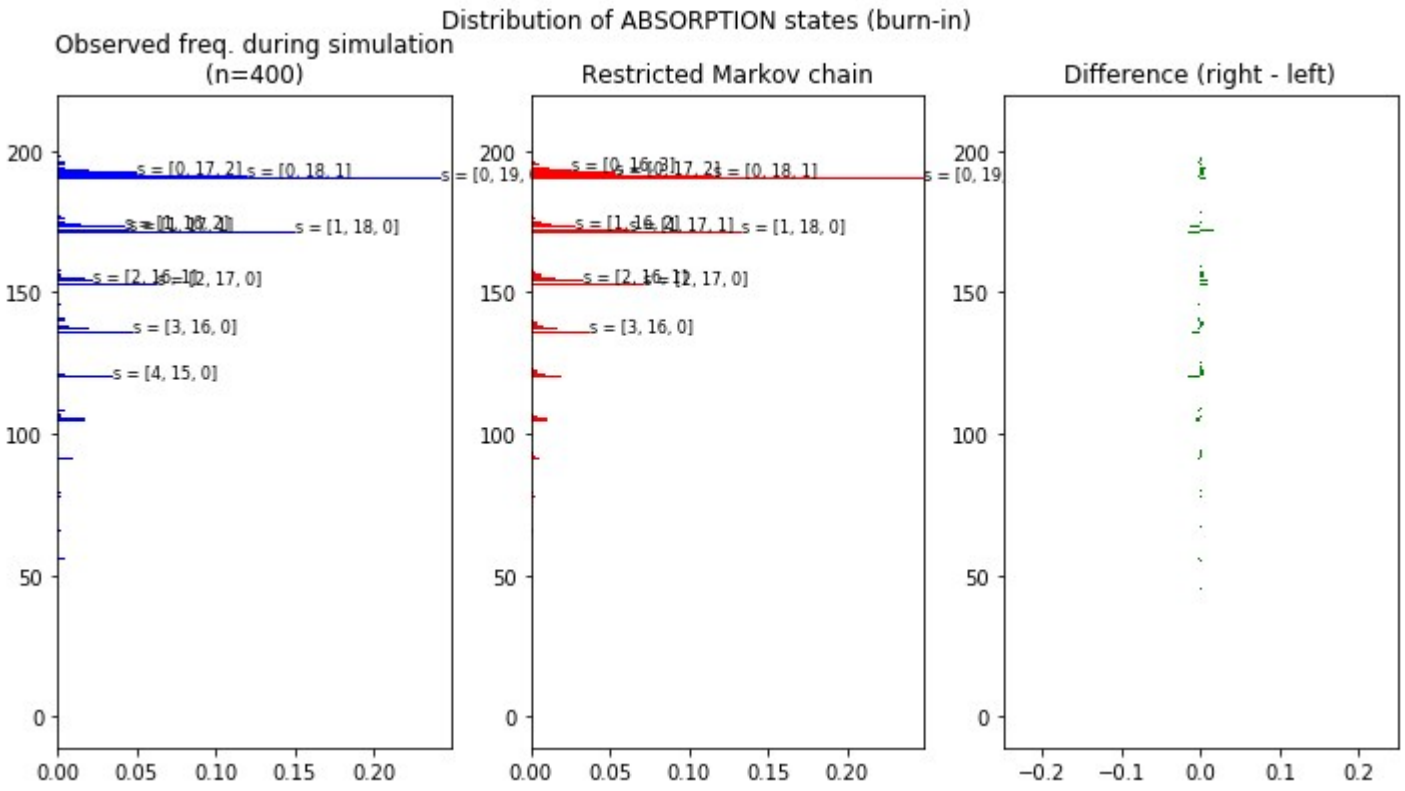


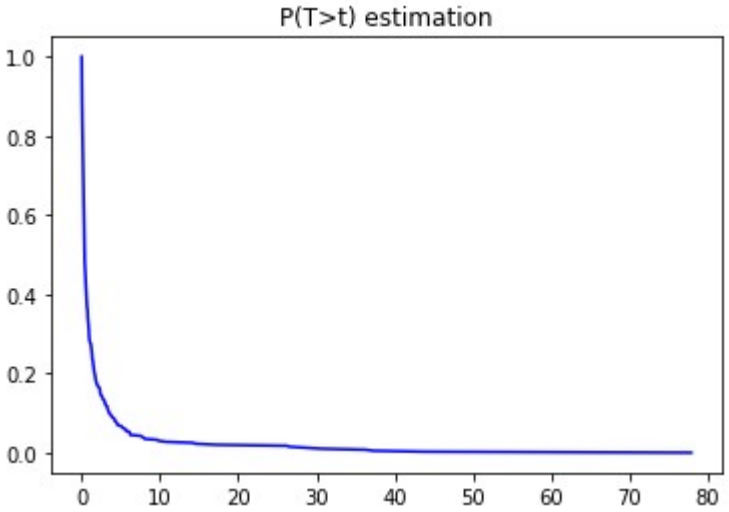
K=40, rhos=[0.4, 0.75, 0.35], N=400, activation size=20, maxtime(1)=0.0, maxtime(N)=44.7, mean_lifetime=323.6(n=400), finalize=ABS, seed=1747



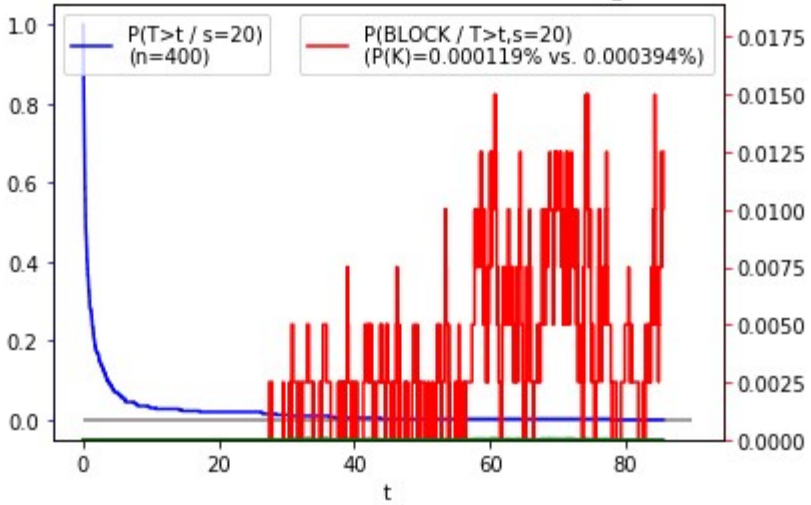
<matplotlib.figure.Figure at 0x2772c1472b0>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [0, 20, 0]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

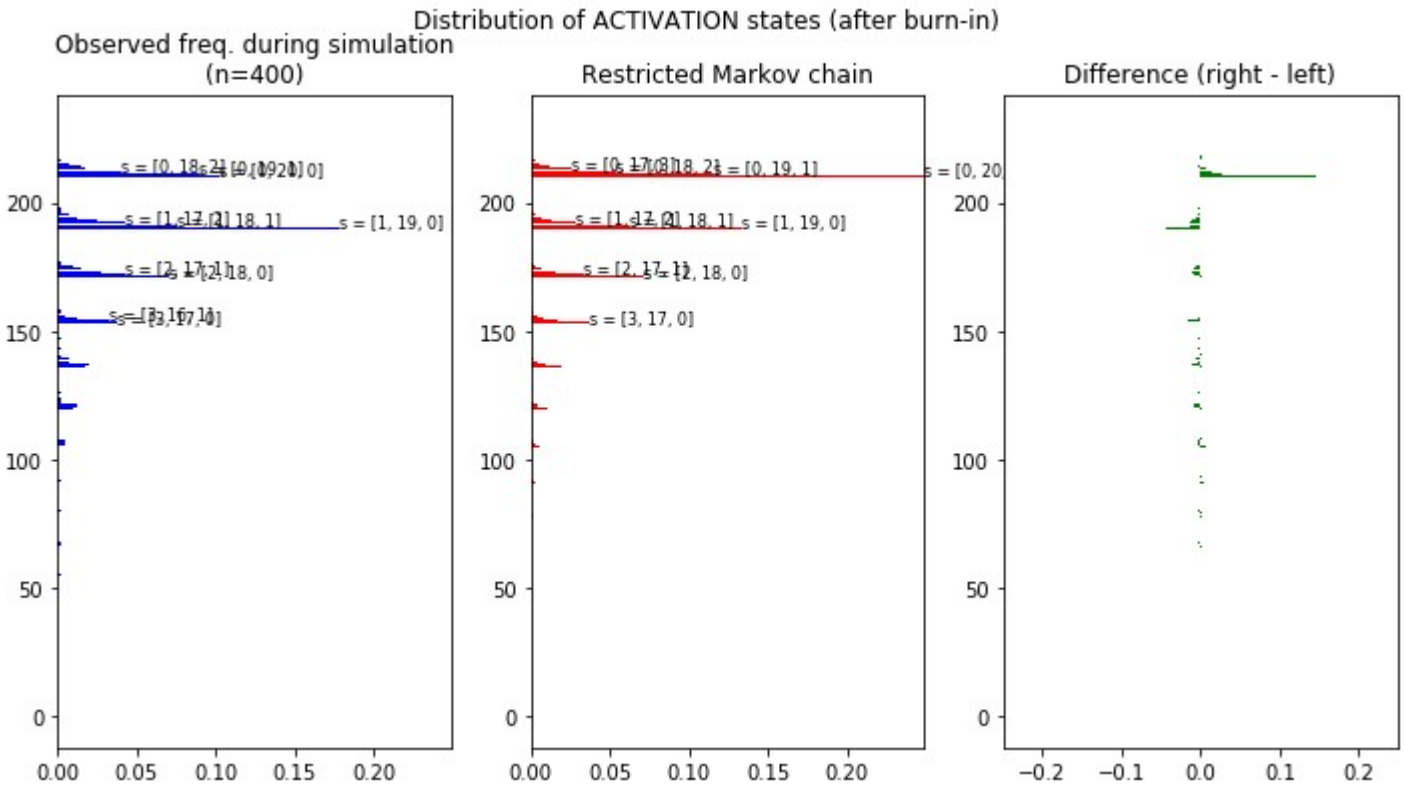

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 17, 2]
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
s = [4, 15, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

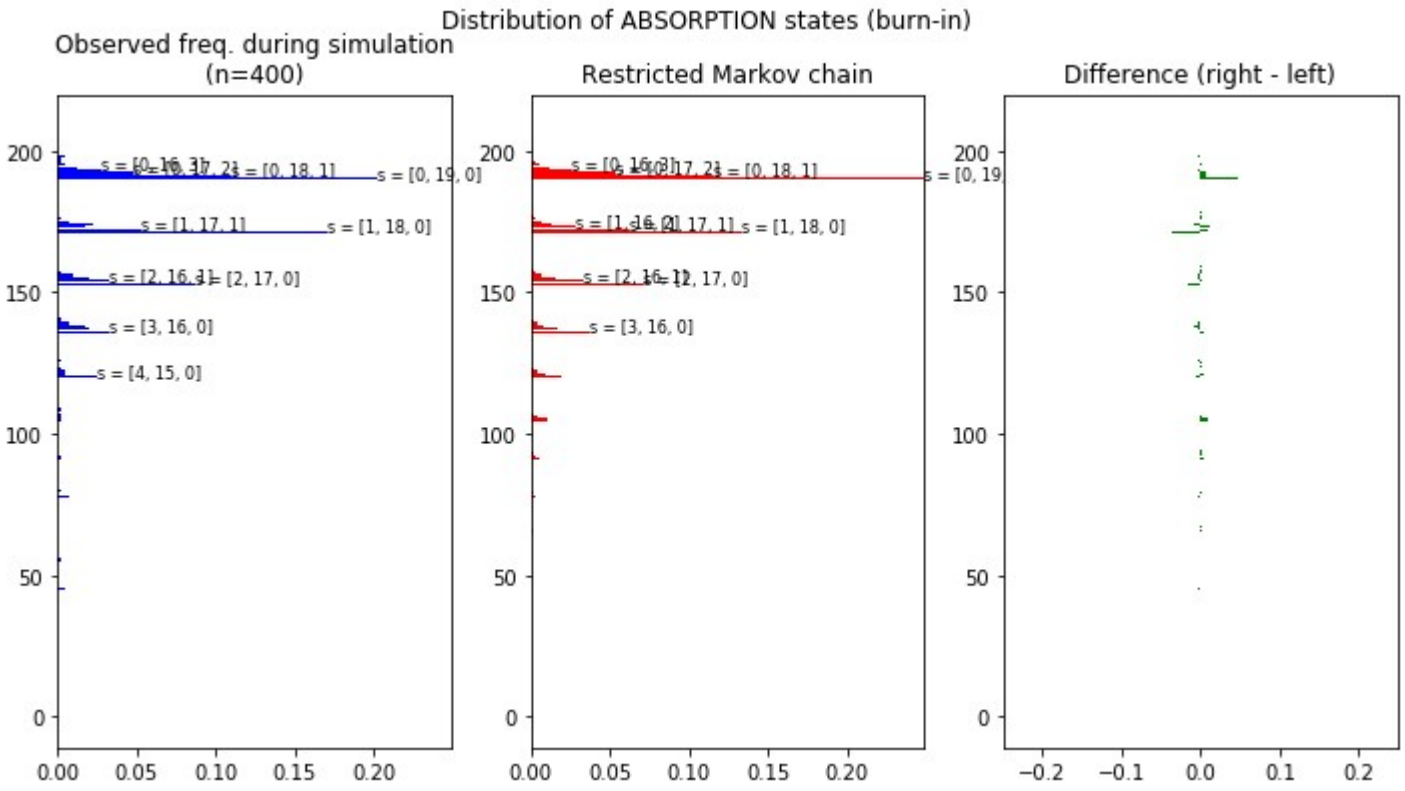


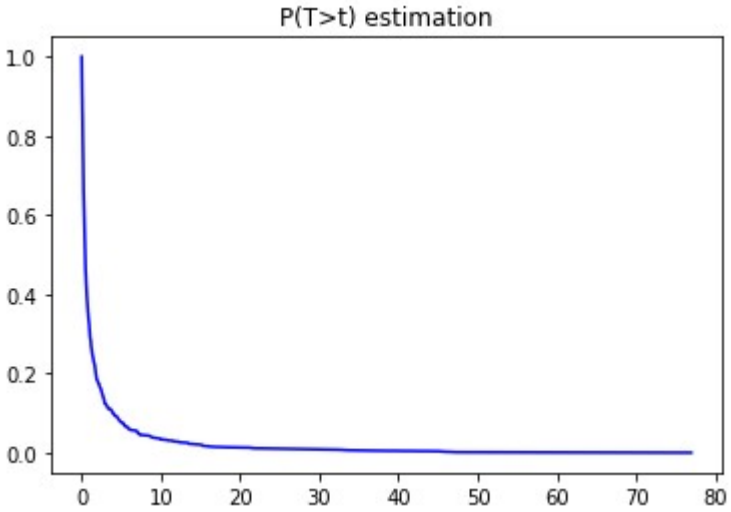
K=40, rhos=[0.4, 0.75, 0.35], N=400, activation size=20, maxtime(1)=0.0, maxtime(N)=85.7, mean_lifetime=525.6(n=400), finalize=ABS, seed=1757



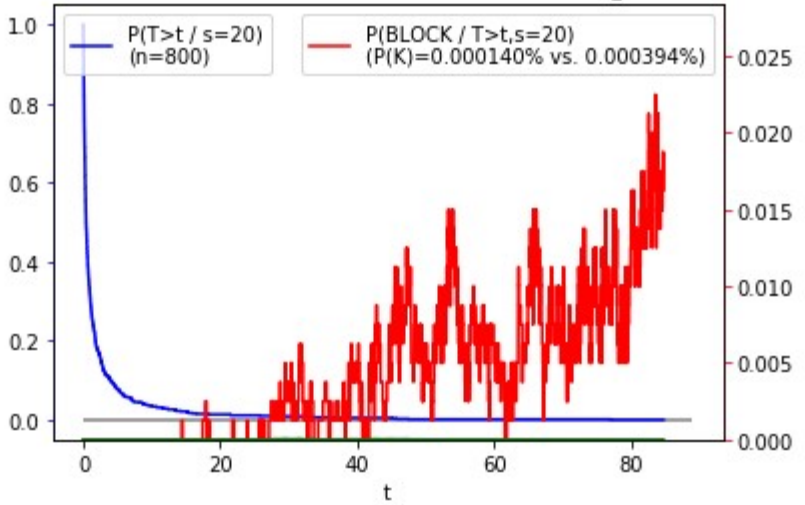
<matplotlib.figure.Figure at 0x27735757518>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [1, 19, 0]
s = [2, 17, 1]
s = [2, 18, 0]
s = [3, 17, 0]
s = [0, 19, 1]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

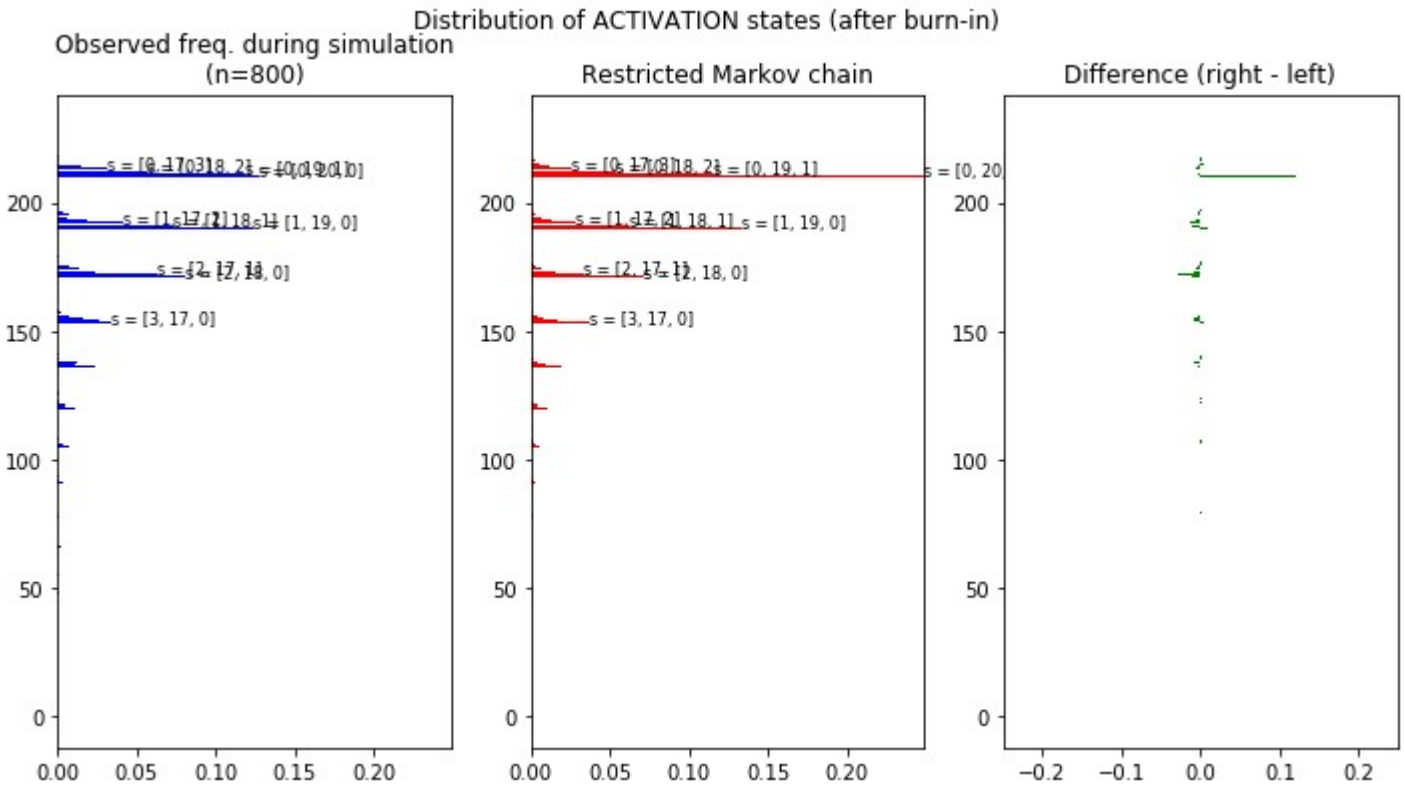

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=400)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [0, 19, 0]
s = [1, 17, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
s = [4, 15, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

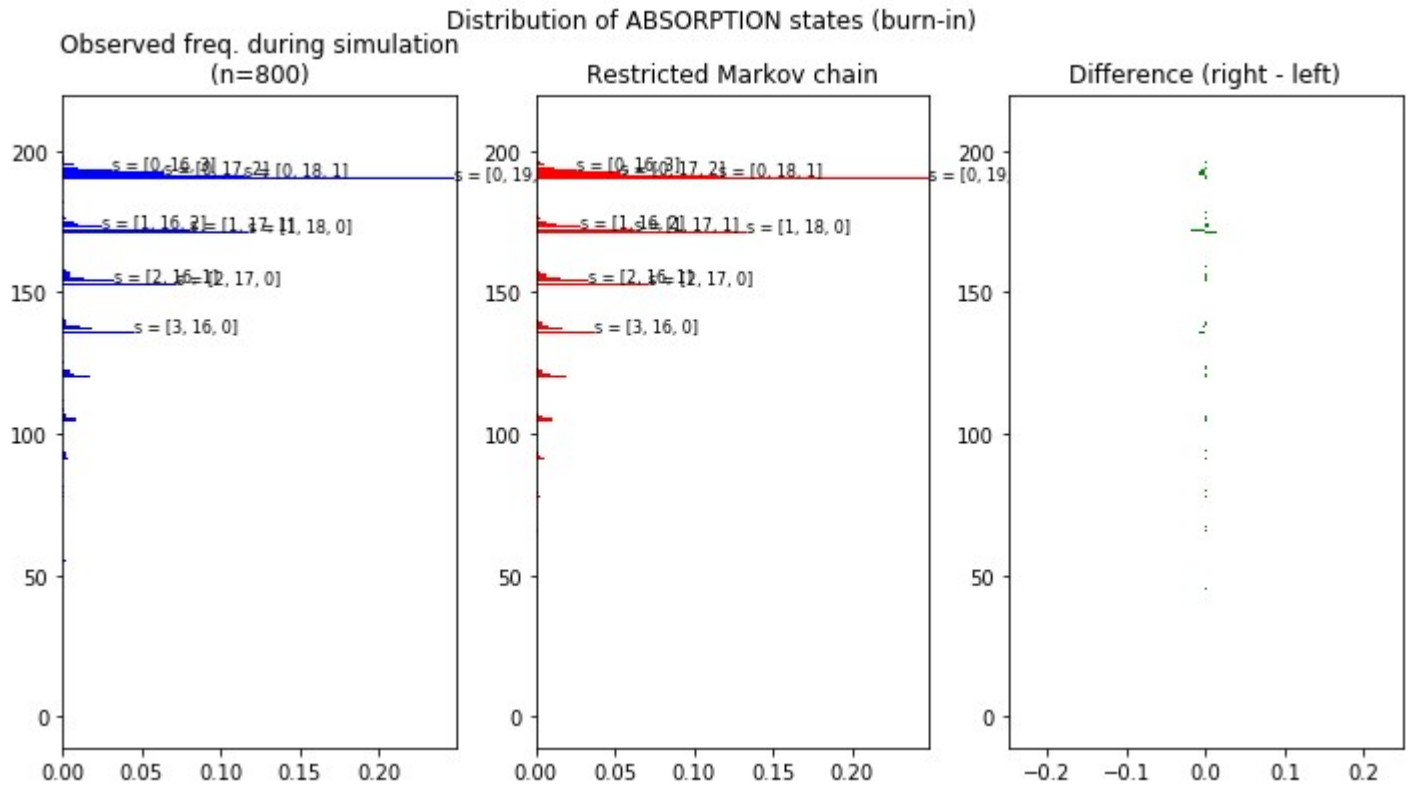


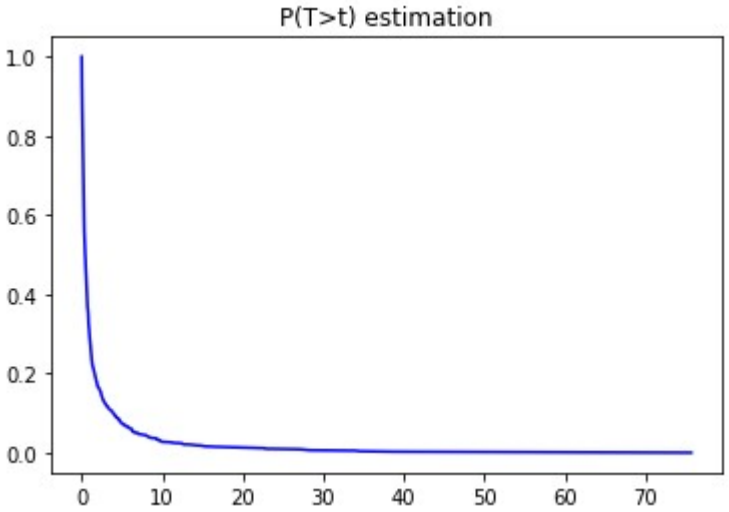
K=40, rhos=[0.4, 0.75, 0.35], N=800, activation size=20, maxtime(1)=0.0, maxtime(N)=84.7, mean_lifetime=468.3(n=800), finalize=ABS, seed=1717



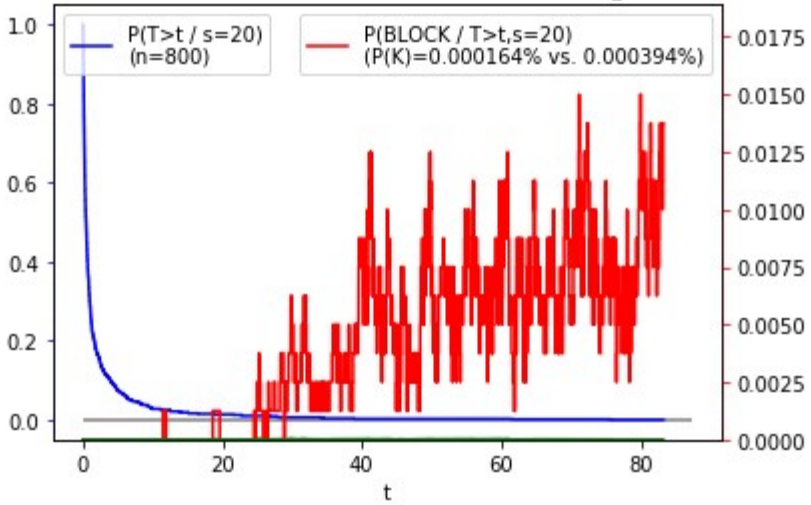
<matplotlib.figure.Figure at 0x27747294320>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
s = [0, 19, 1]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

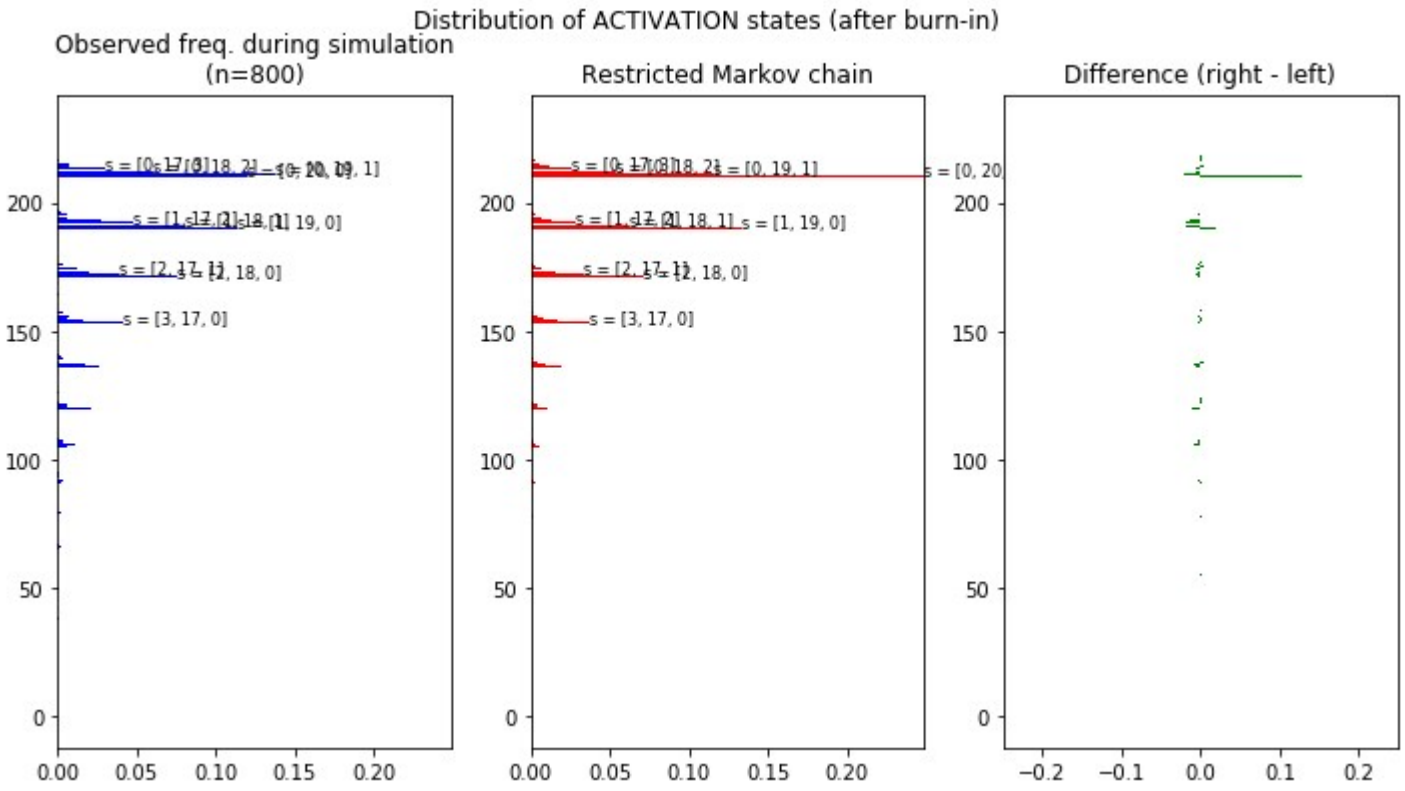

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

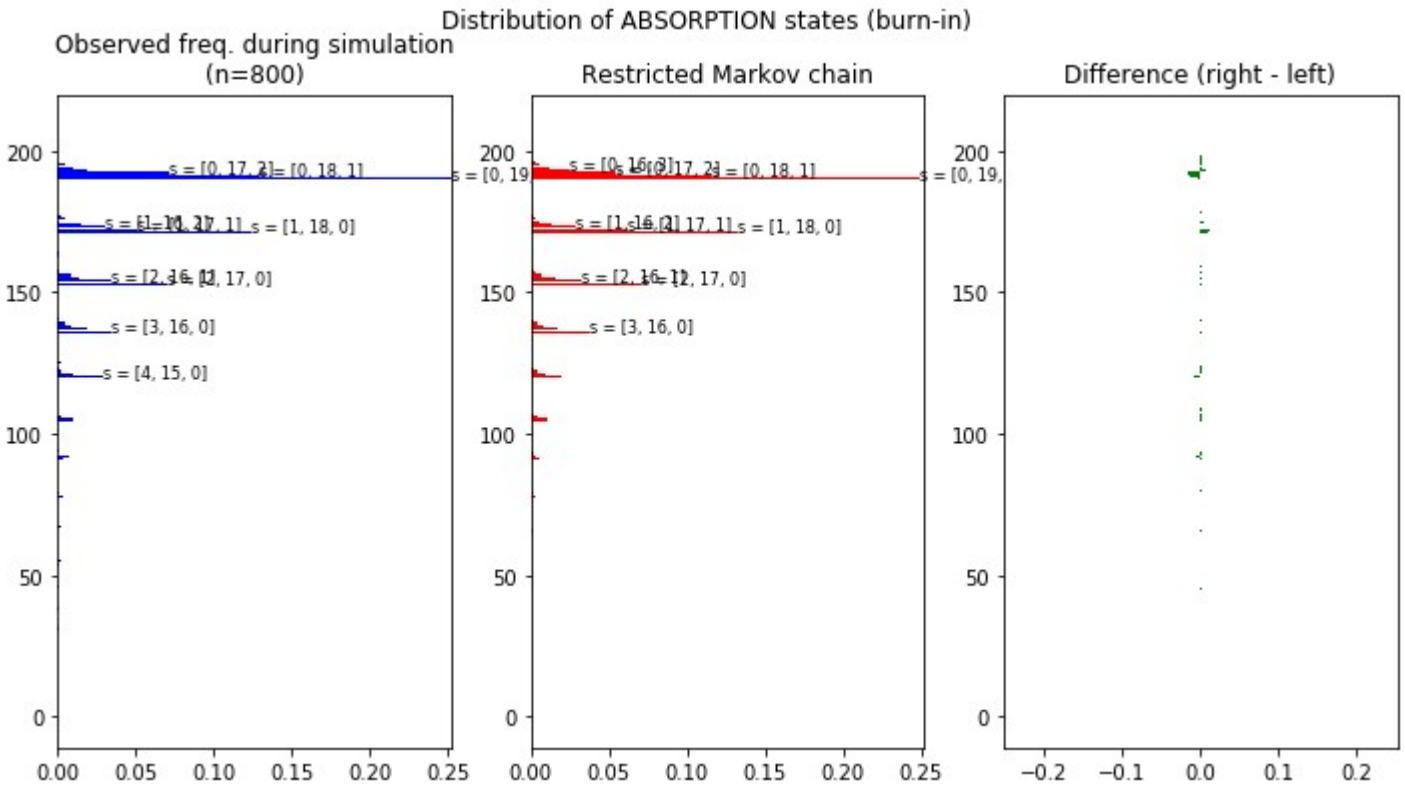


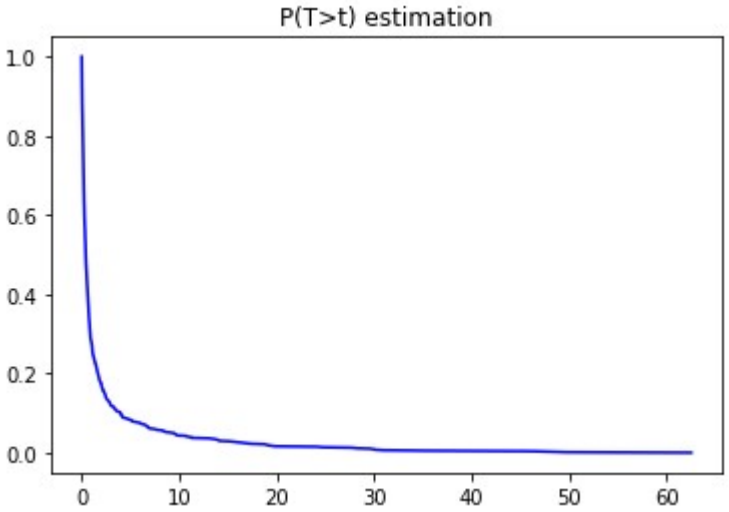
K=40, rhos=[0.4, 0.75, 0.35], N=800, activation size=20, maxtime(1)=0.0, maxtime(N)=83.2, mean_lifetime=428.8(n=800), finalize=ABS, seed=1727



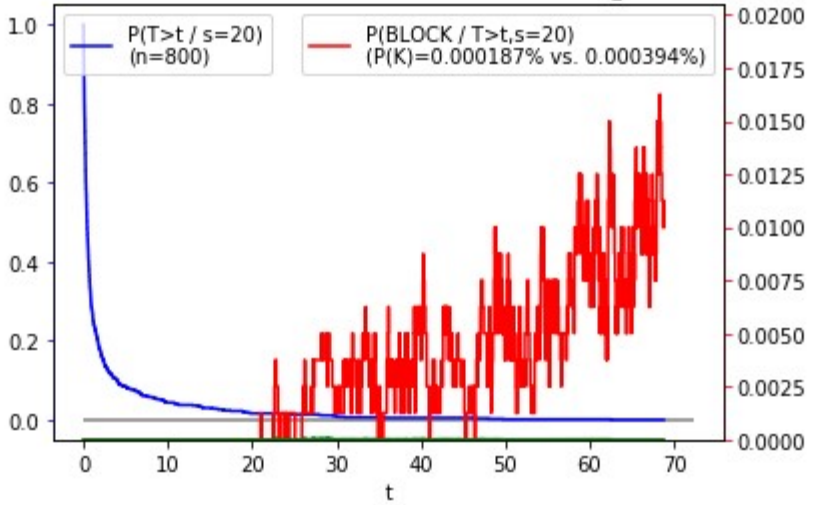
<matplotlib.figure.Figure at 0x277381d3128>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

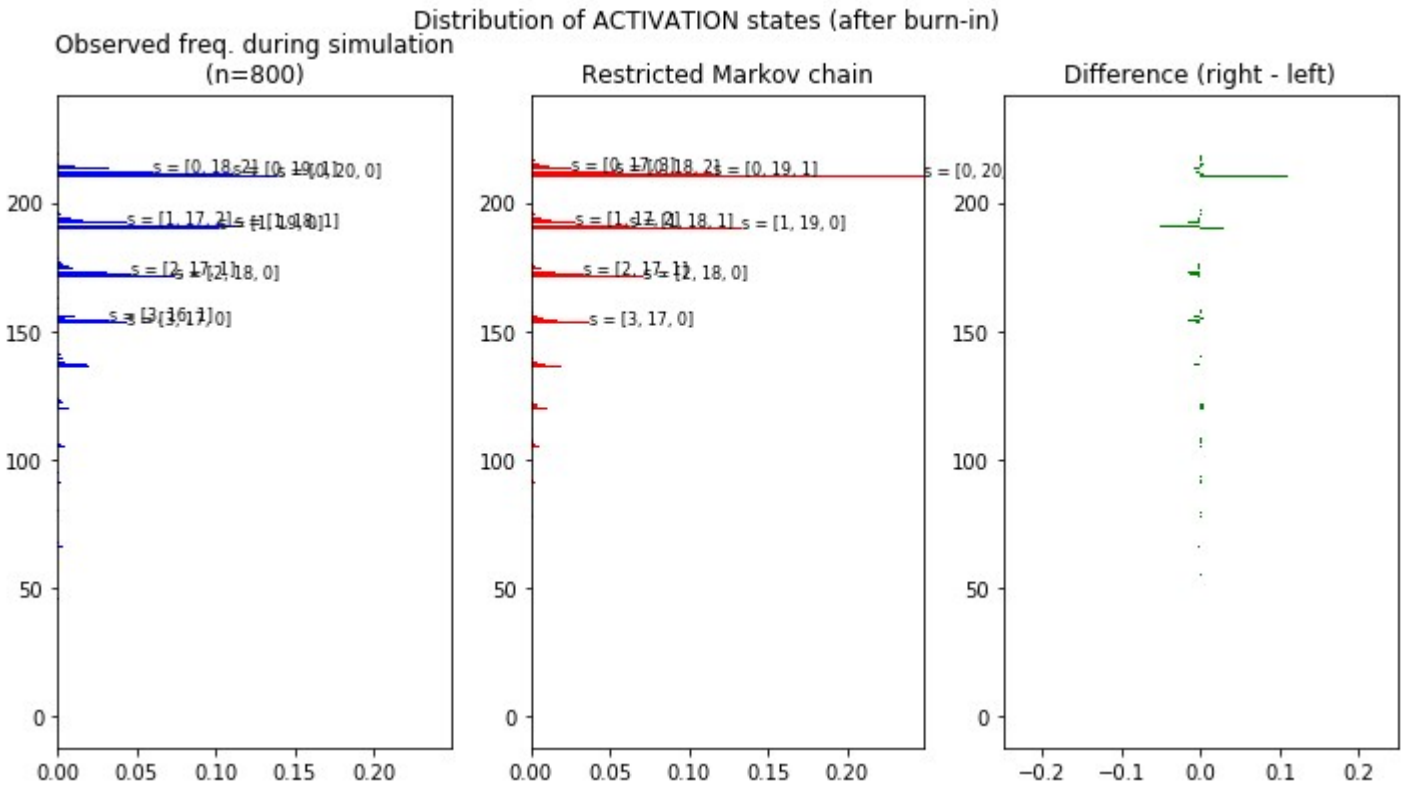

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 17, 2]
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 16, 2]
s = [3, 16, 0]
s = [4, 15, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
0.25
−0.2
−0.1
0.0
0.1
0.2

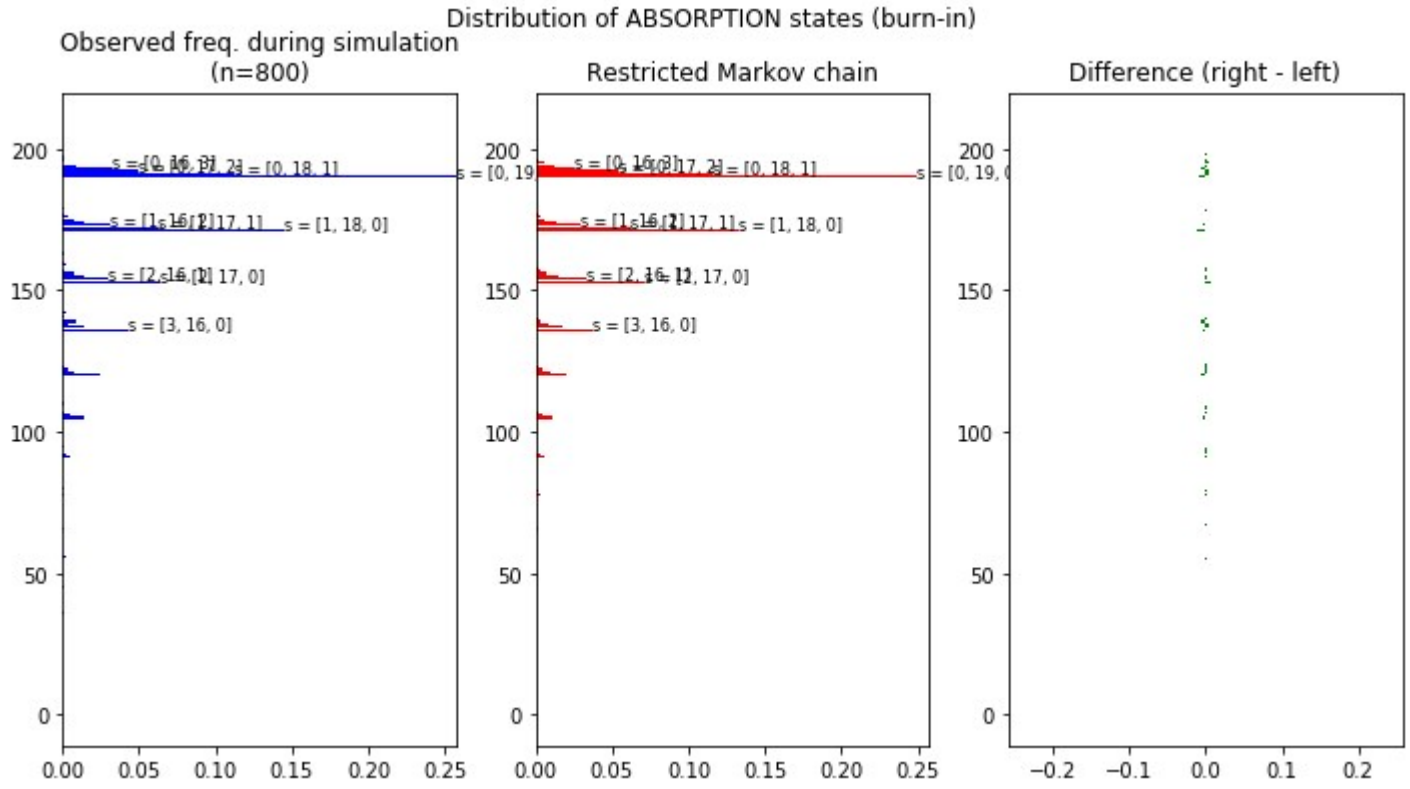


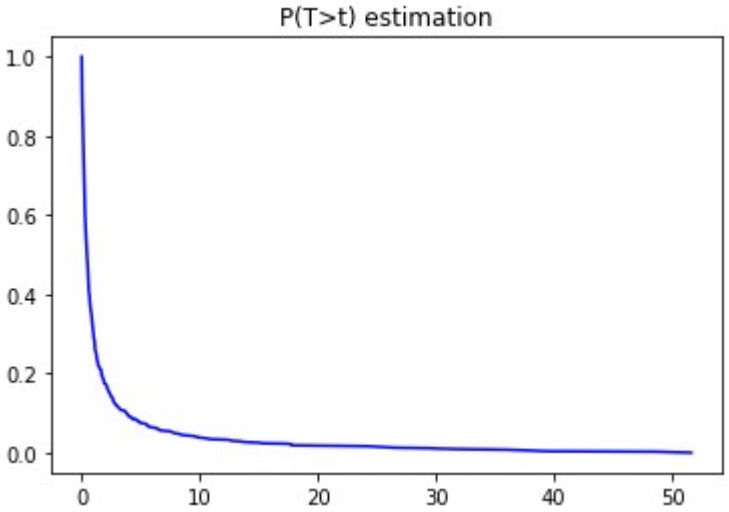
K=40, rhos=[0.4, 0.75, 0.35], N=800, activation size=20, maxtime(1)=0.0, maxtime(N)=68.8, mean_lifetime=333.7(n=800), finalize=ABS, seed=1737



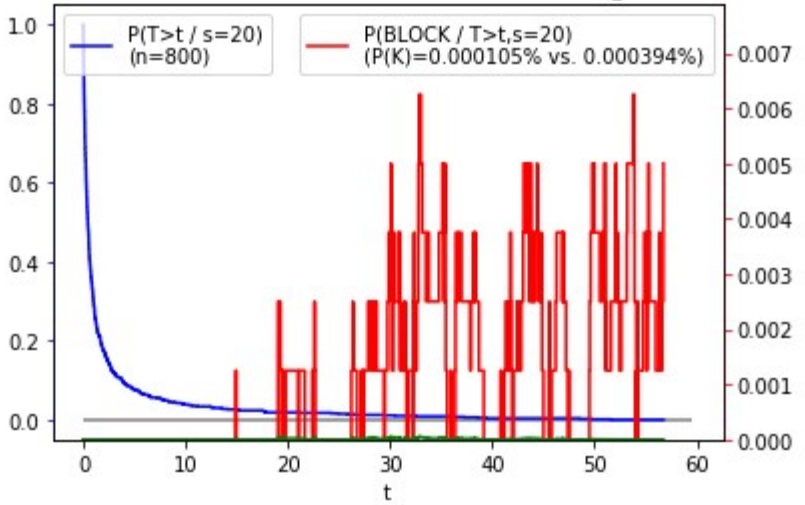
<matplotlib.figure.Figure at 0x277135ec4e0>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

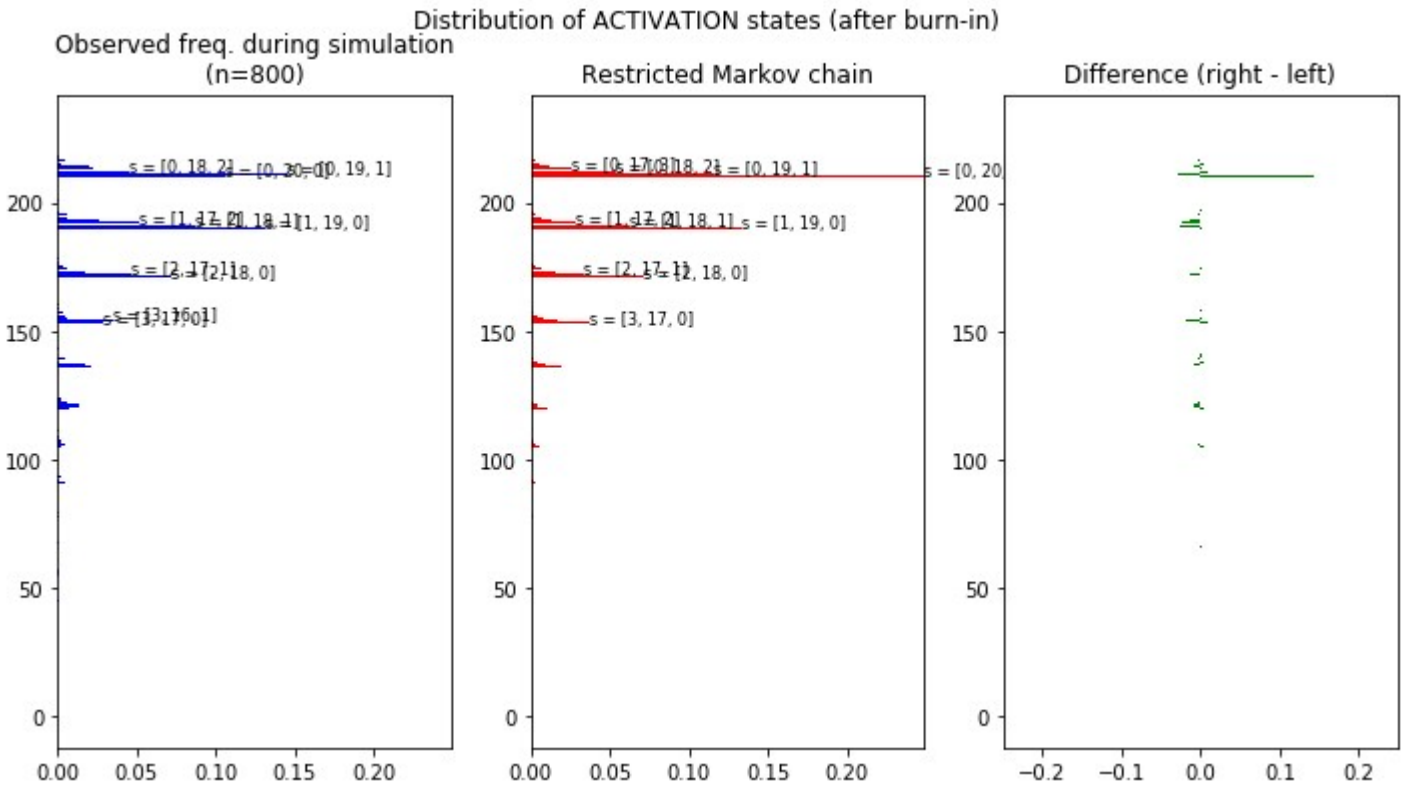

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 16, 1] 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
0.25
−0.2
−0.1
0.0
0.1
0.2

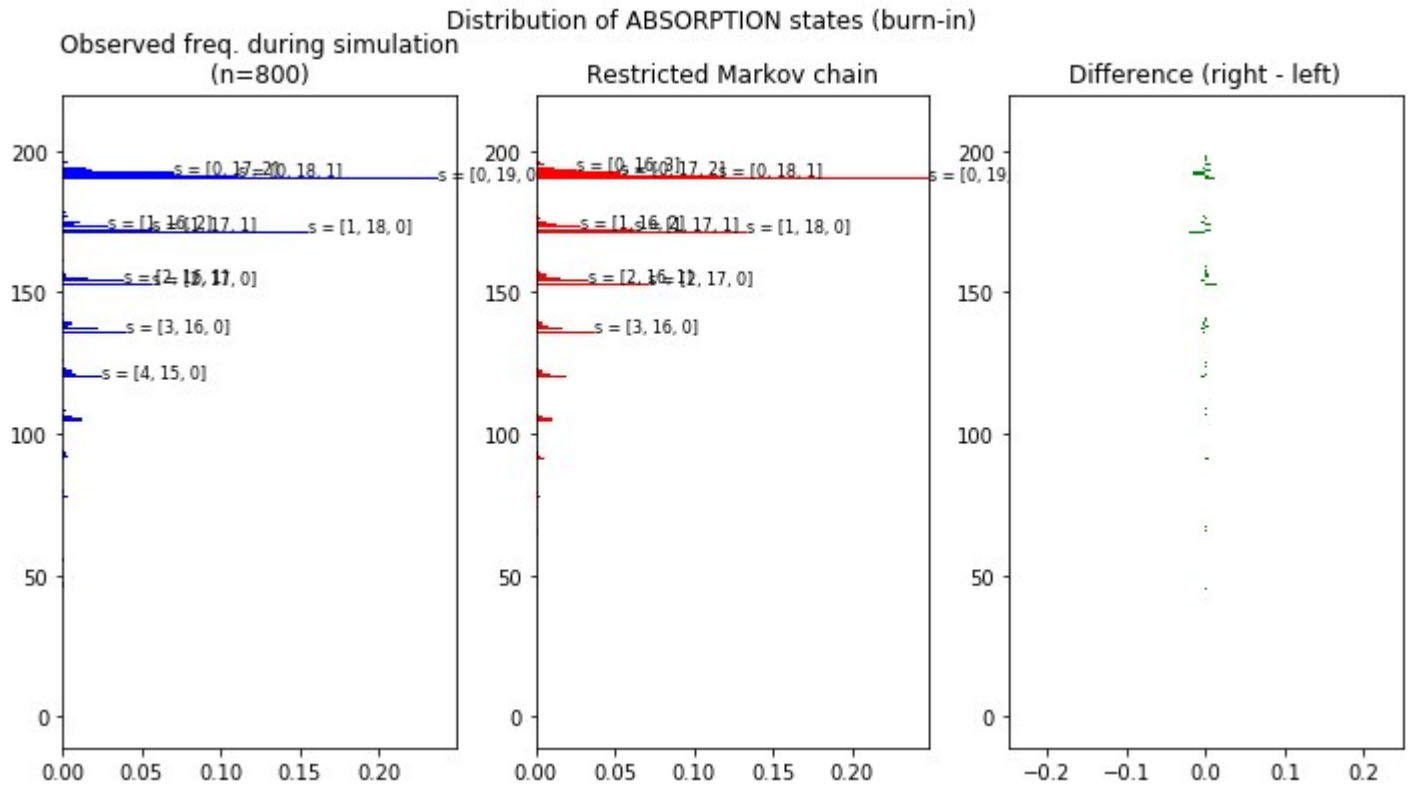


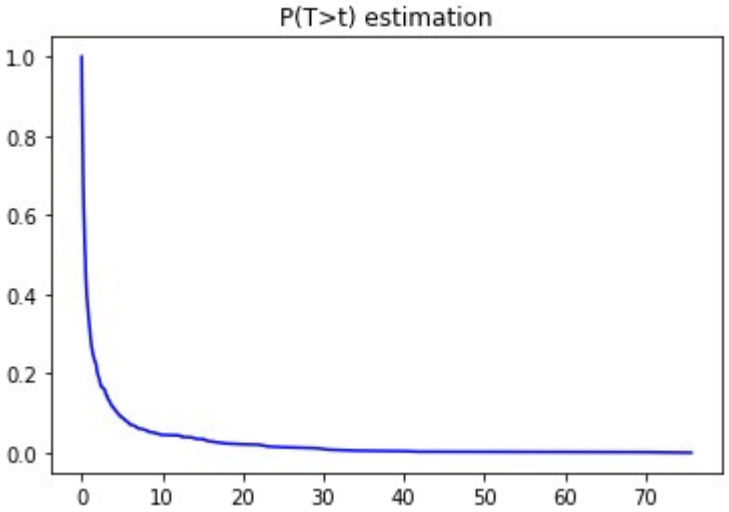
K=40, rhos=[0.4, 0.75, 0.35], N=800, activation size=20, maxtime(1)=0.0, maxtime(N)=56.7, mean_lifetime=362.7(n=800), finalize=ABS, seed=1747



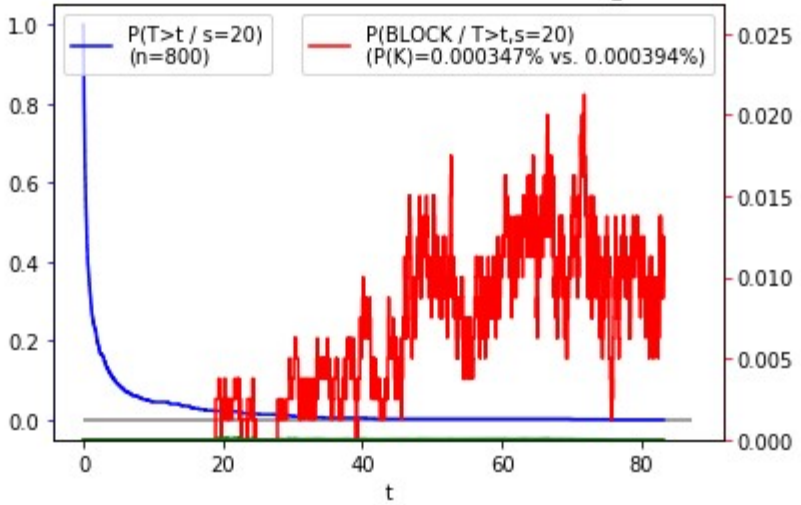
<matplotlib.figure.Figure at 0x277003860f0>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

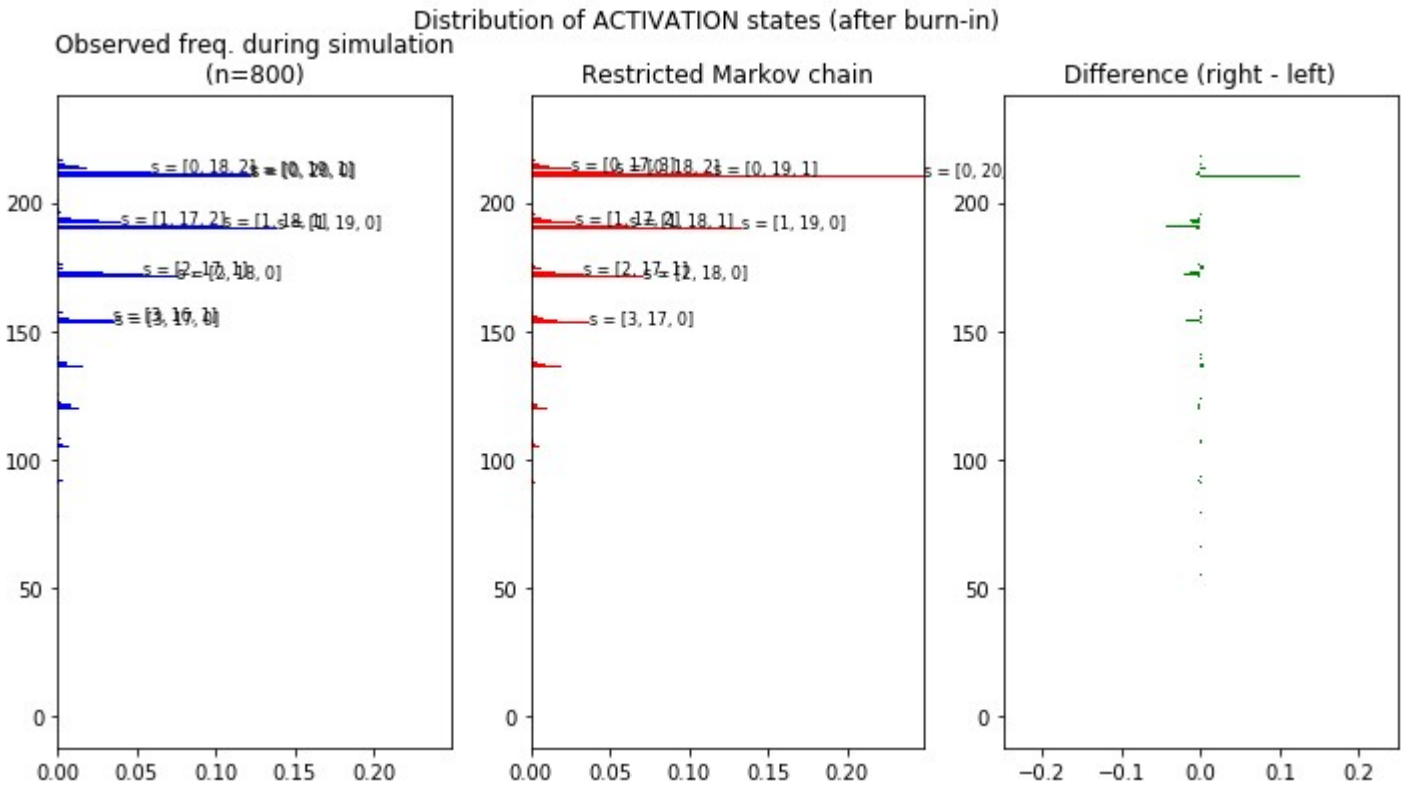

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 0]
s = [0, 18, 1]
s = [1, 18, 0]
s = [3, 16, 0]
s = [4, 15, 0]
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2
0
50
100
150
200

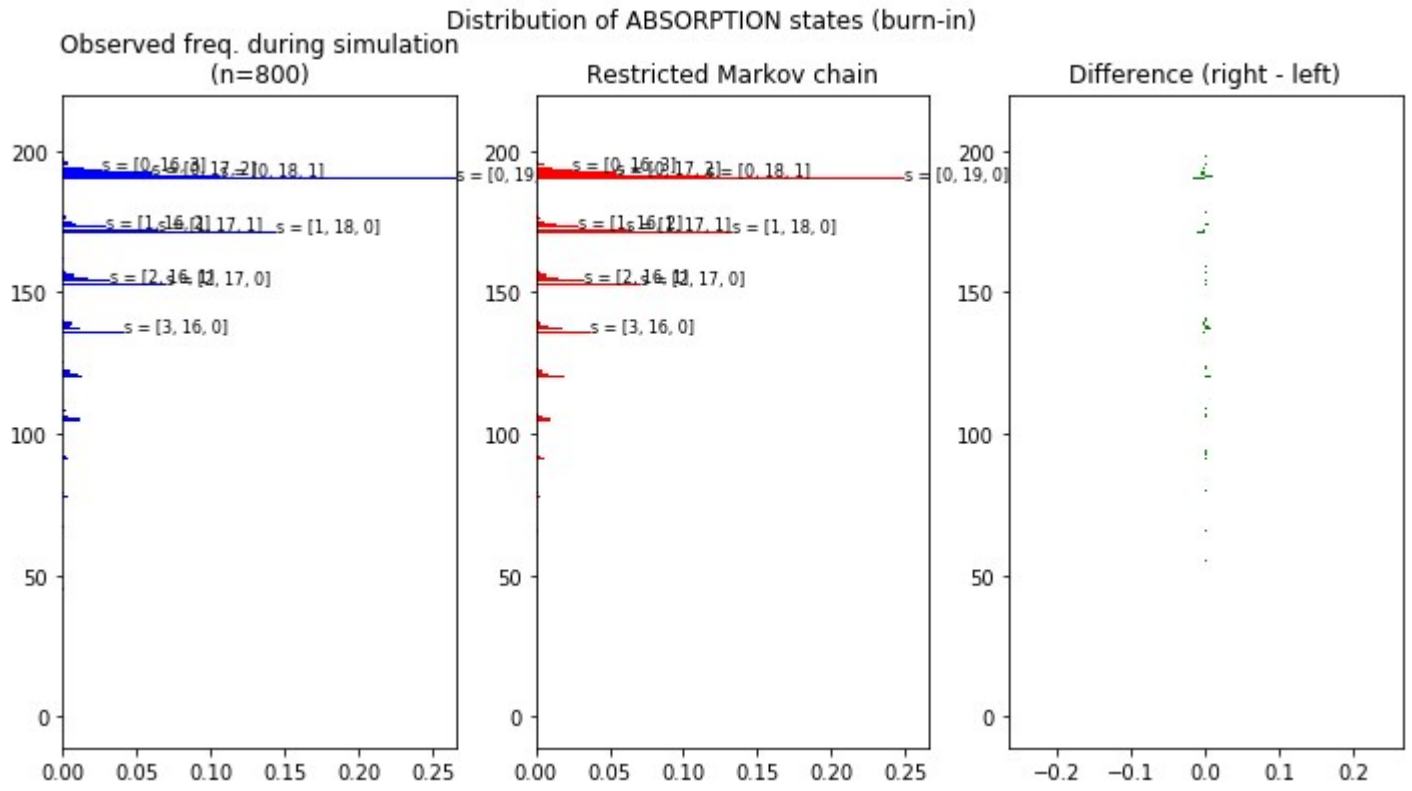


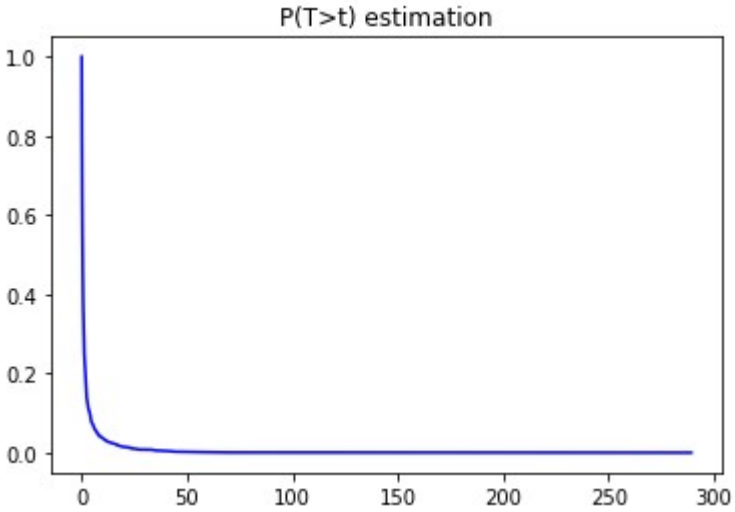
K=40, rhos=[0.4, 0.75, 0.35], N=800, activation size=20, maxtime(1)=0.0, maxtime(N)=83.2, mean_lifetime=375.9(n=800), finalize=ABS, seed=1757



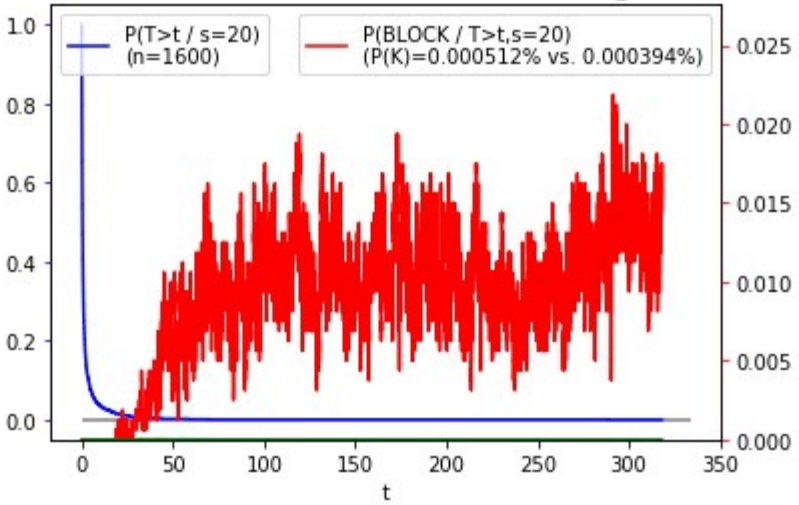
<matplotlib.figure.Figure at 0x27714cd62b0>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [3, 17, 0]
s = [1, 19, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

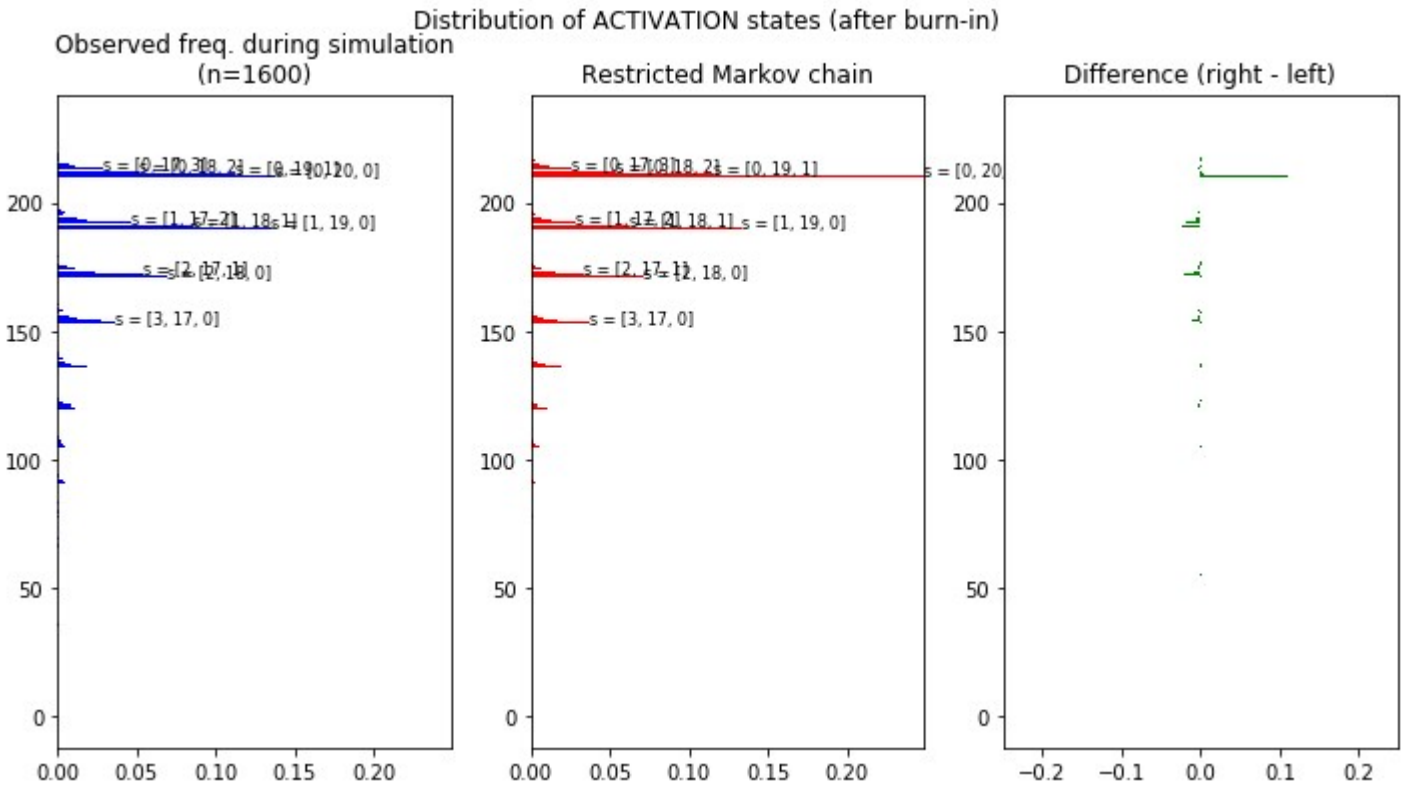

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=800)
Restricted Markov chain
Difference (right - left)
s = [1, 18, 0]
s = [3, 16, 0]
s = [0, 19, 0]
200
150
100
50
0
0.00
0.05
0.10
0.15
0.20
0.25
−0.2
−0.1
0.0
0.1
0.2

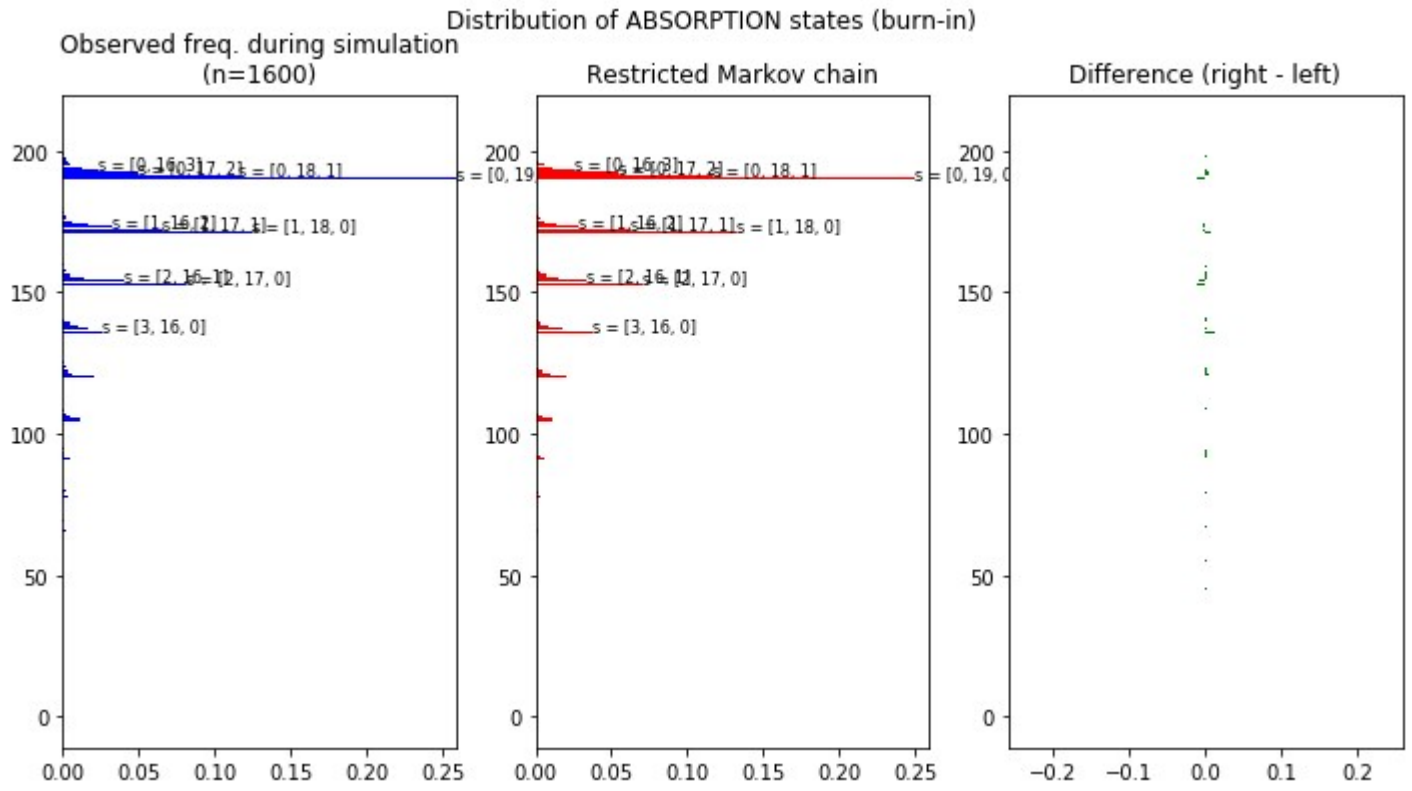


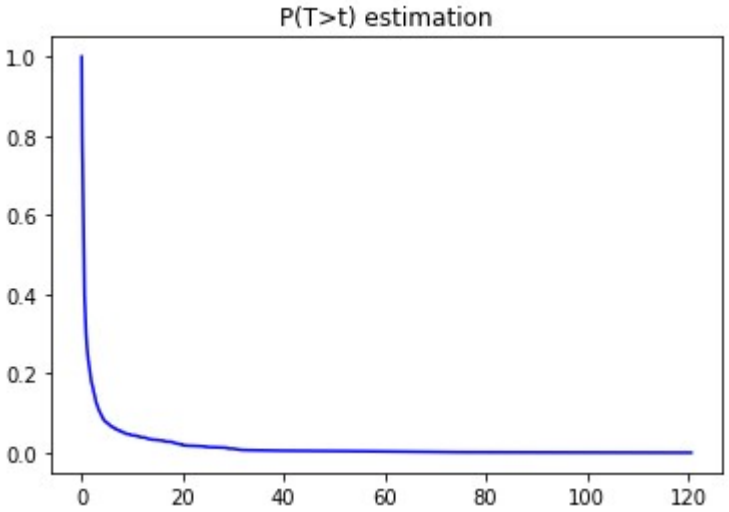
K=40, rhos=[0.4, 0.75, 0.35], N=1600, activation size=20, maxtime(1)=0.0, maxtime(N)=318.0, mean_lifetime=394.9(n=1600), finalize=ABS, seed=1717



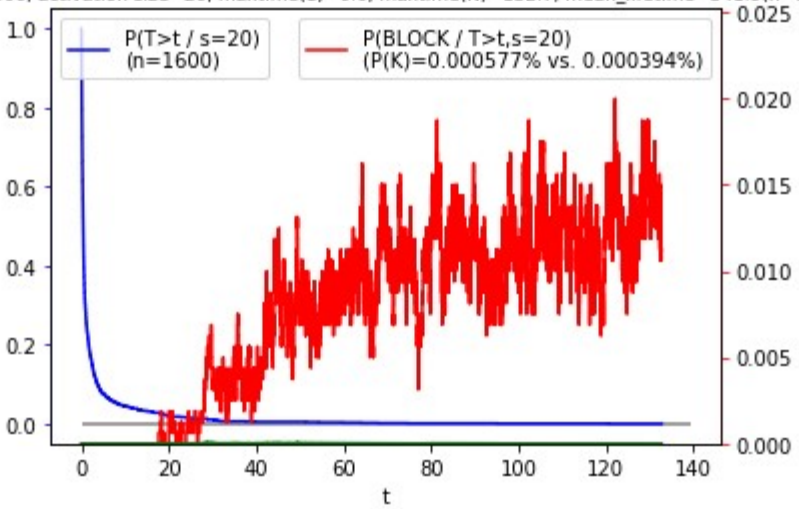
<matplotlib.figure.Figure at 0x277081cfd30>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [3, 17, 0]
s = [1, 19, 0]
s = [0, 19, 1]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

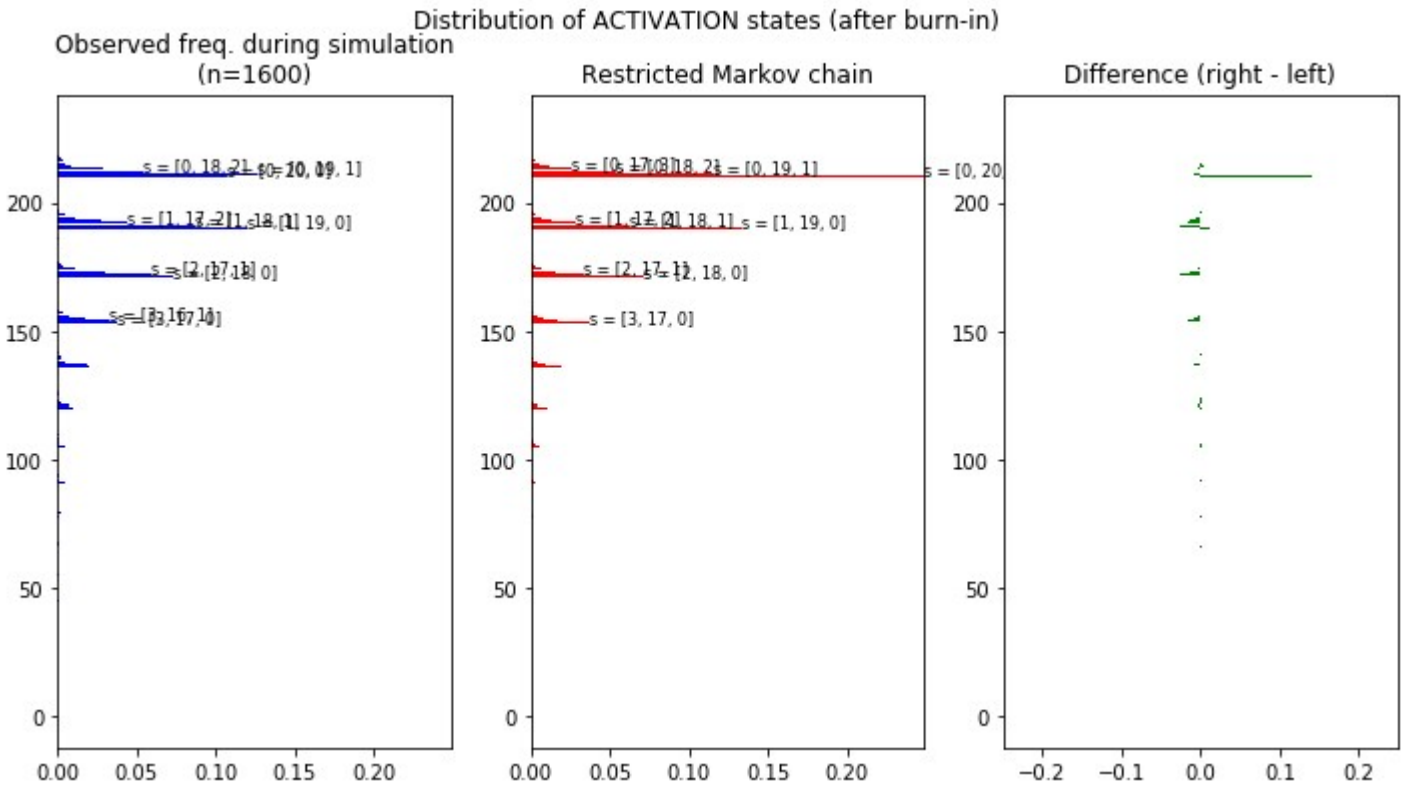

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
0.25
−0.2
−0.1
0.0
0.1
0.2

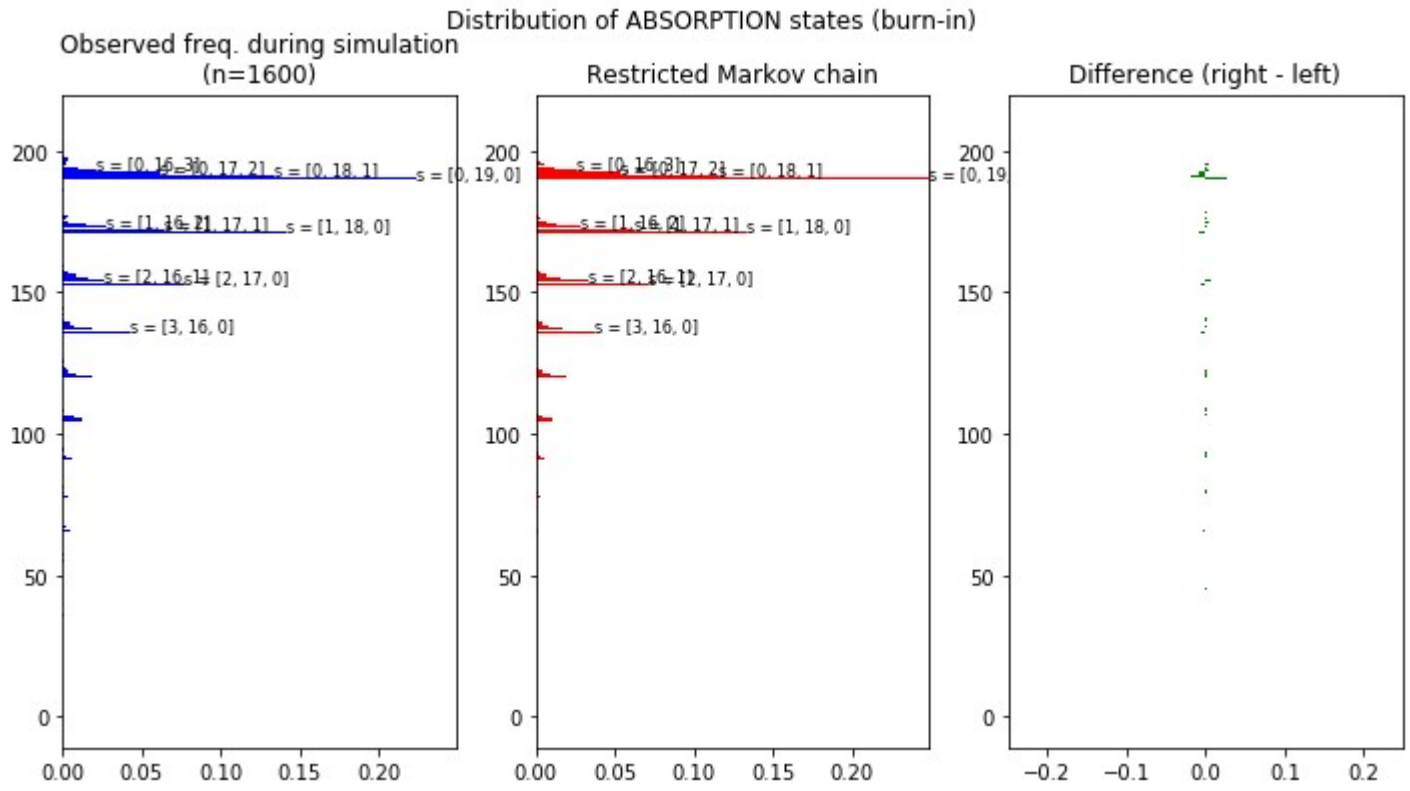


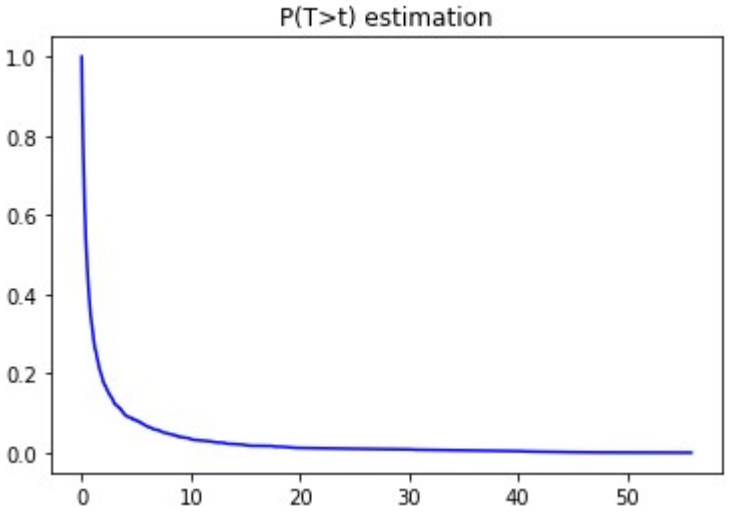
K=40, rhos=[0.4, 0.75, 0.35], N=1600, activation size=20, maxtime(1)=0.0, maxtime(N)=132.7, mean_lifetime=341.9(n=1600), finalize=ABS, seed=1727



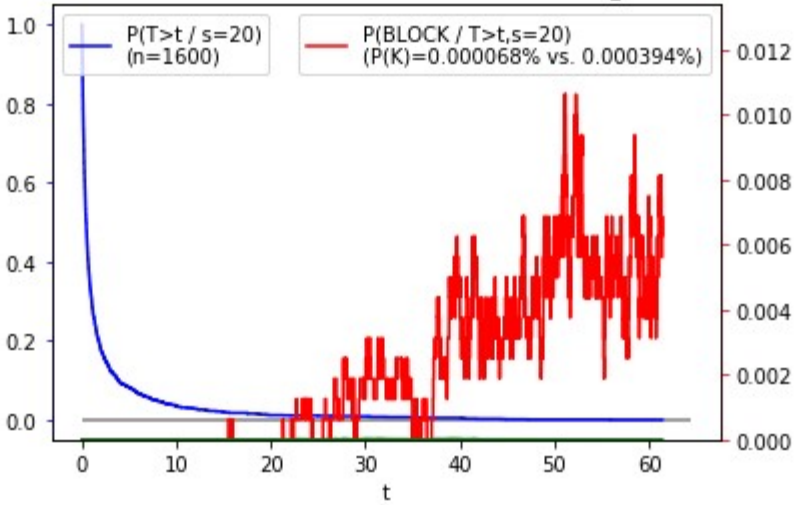
<matplotlib.figure.Figure at 0x2770e3a2438>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
s = [3, 17, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

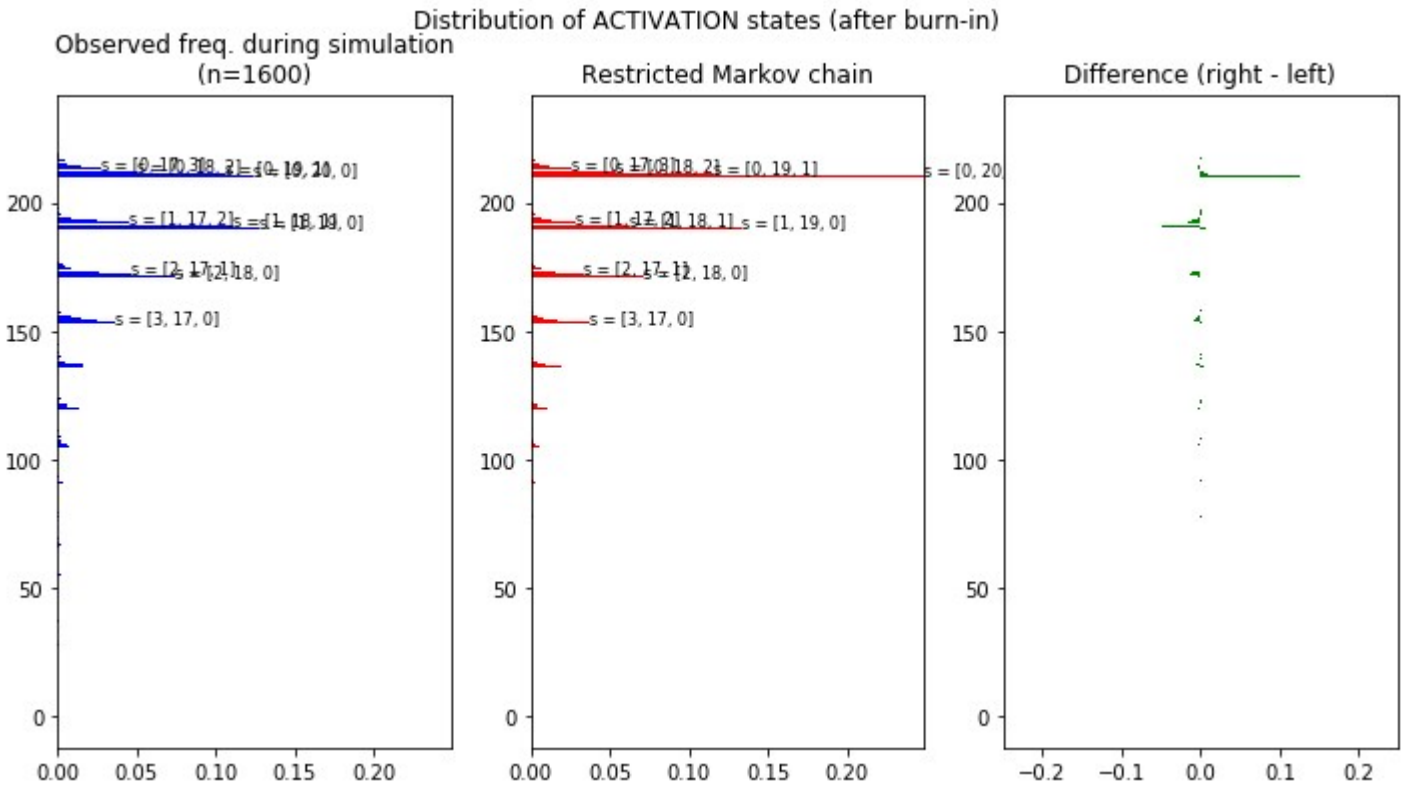

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 19, 0]
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

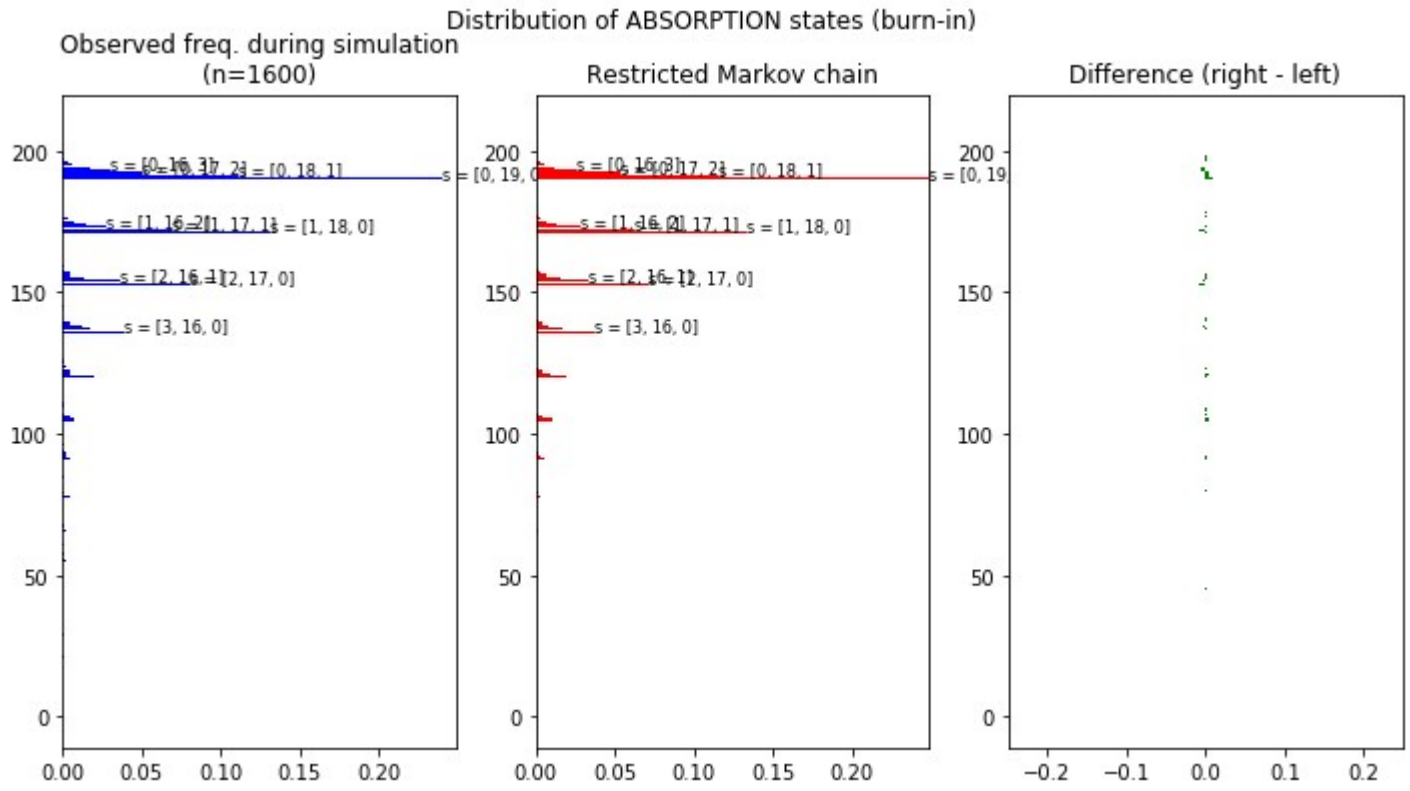


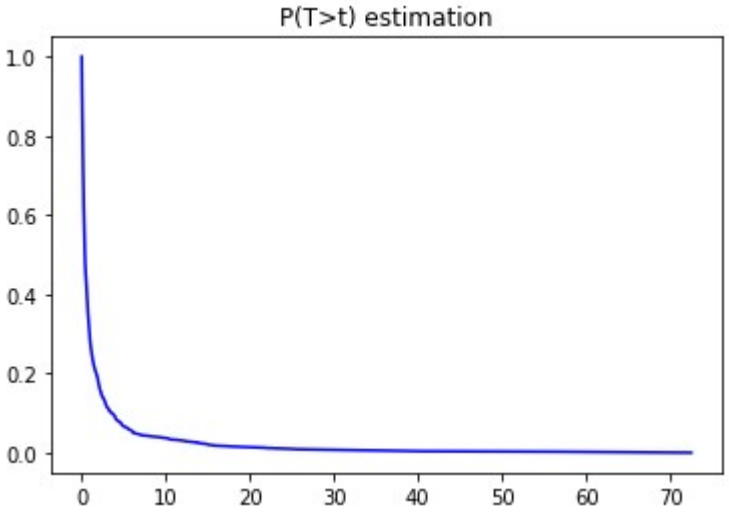
K=40, rhos=[0.4, 0.75, 0.35], N=1600, activation size=20, maxtime(1)=0.0, maxtime(N)=61.5, mean_lifetime=411.9(n=1600), finalize=ABS, seed=1737



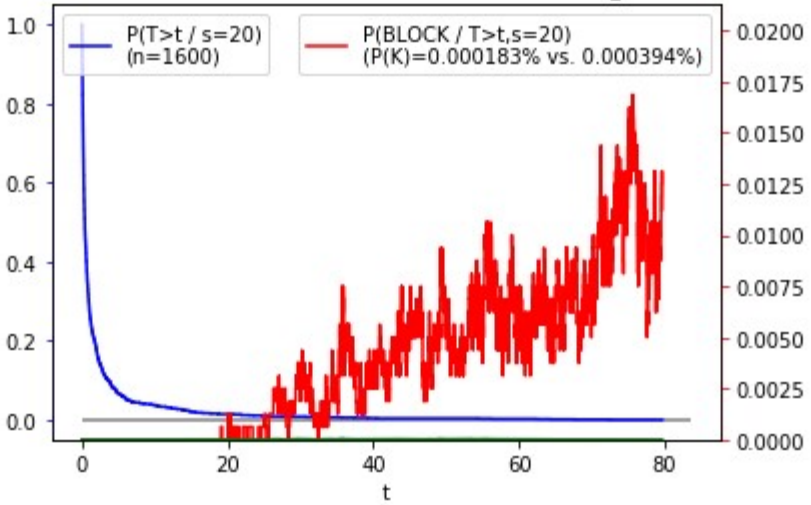
<matplotlib.figure.Figure at 0x2770a96f048>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [3, 17, 0]
s = [1, 19, 0]
s = [0, 19, 1]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

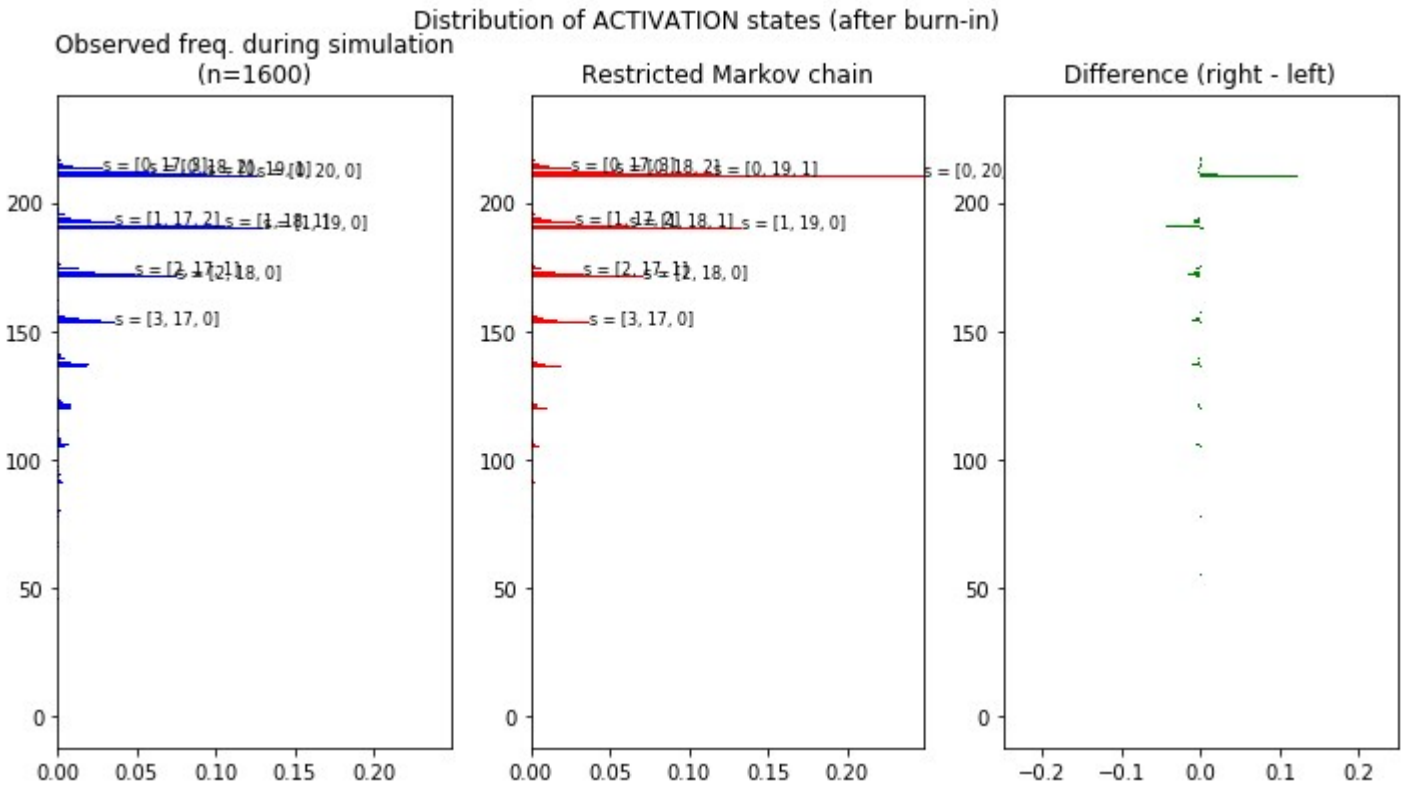

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

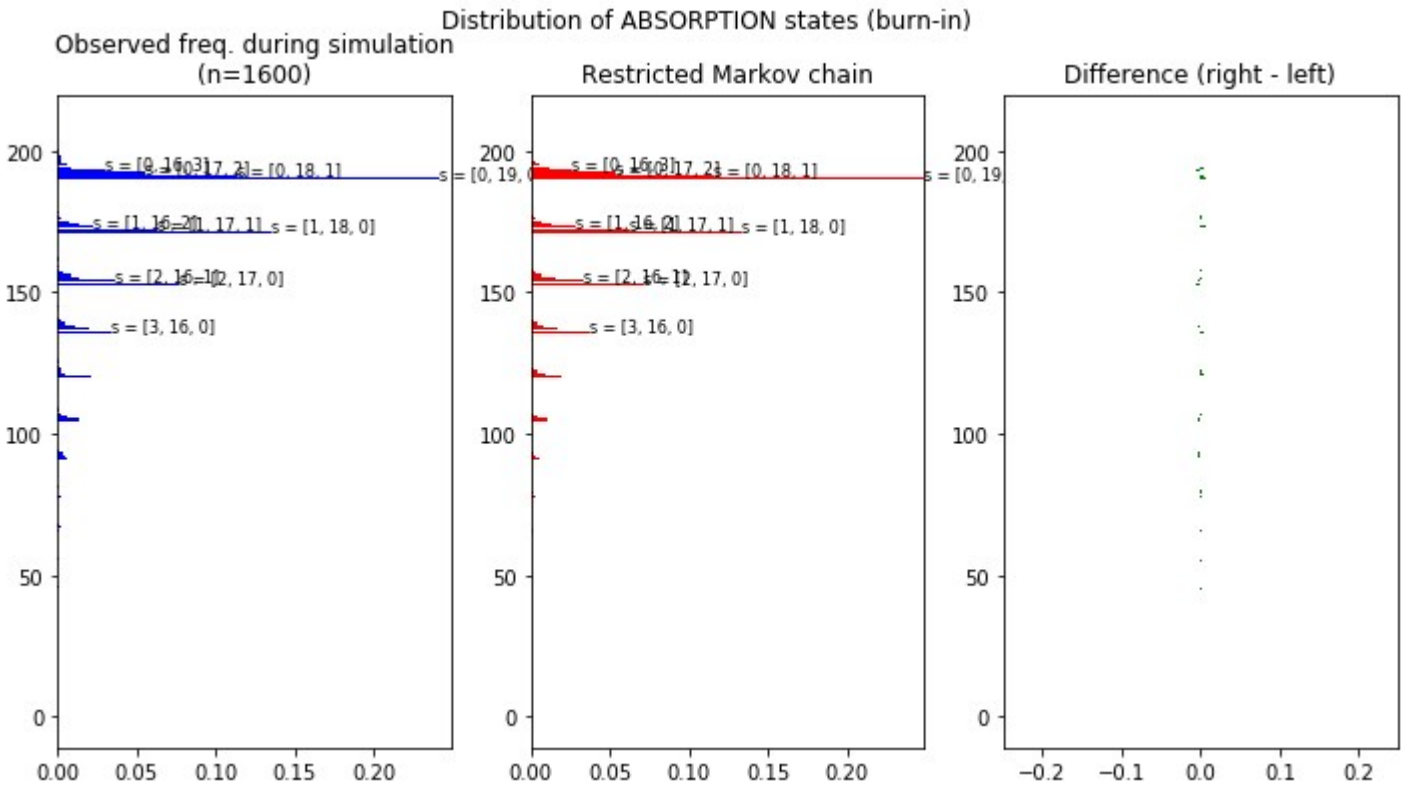


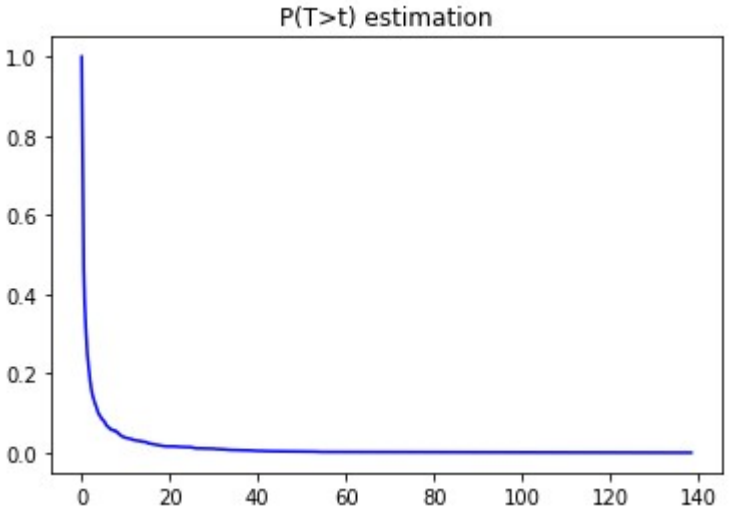
K=40, rhos=[0.4, 0.75, 0.35], N=1600, activation size=20, maxtime(1)=0.0, maxtime(N)=79.7, mean_lifetime=397.8(n=1600), finalize=ABS, seed=1747



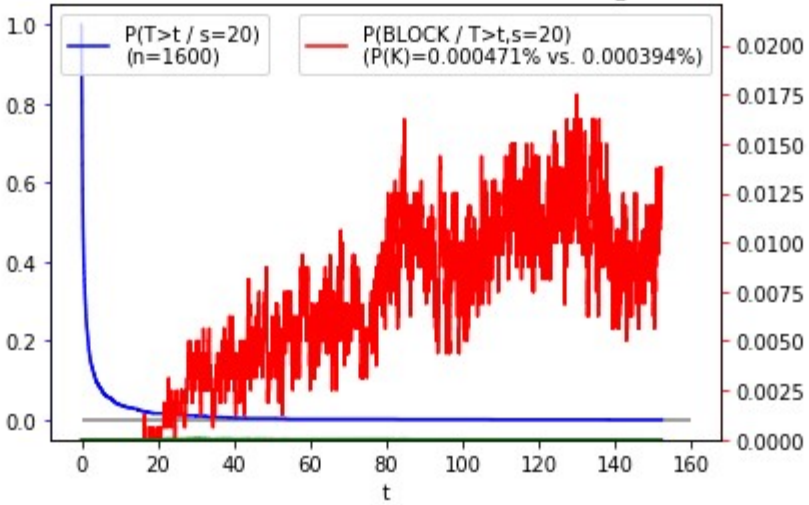
<matplotlib.figure.Figure at 0x2773ed0a358>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [3, 17, 0]
s = [1, 19, 0]
s = [0, 19, 1]
s = [0, 20, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

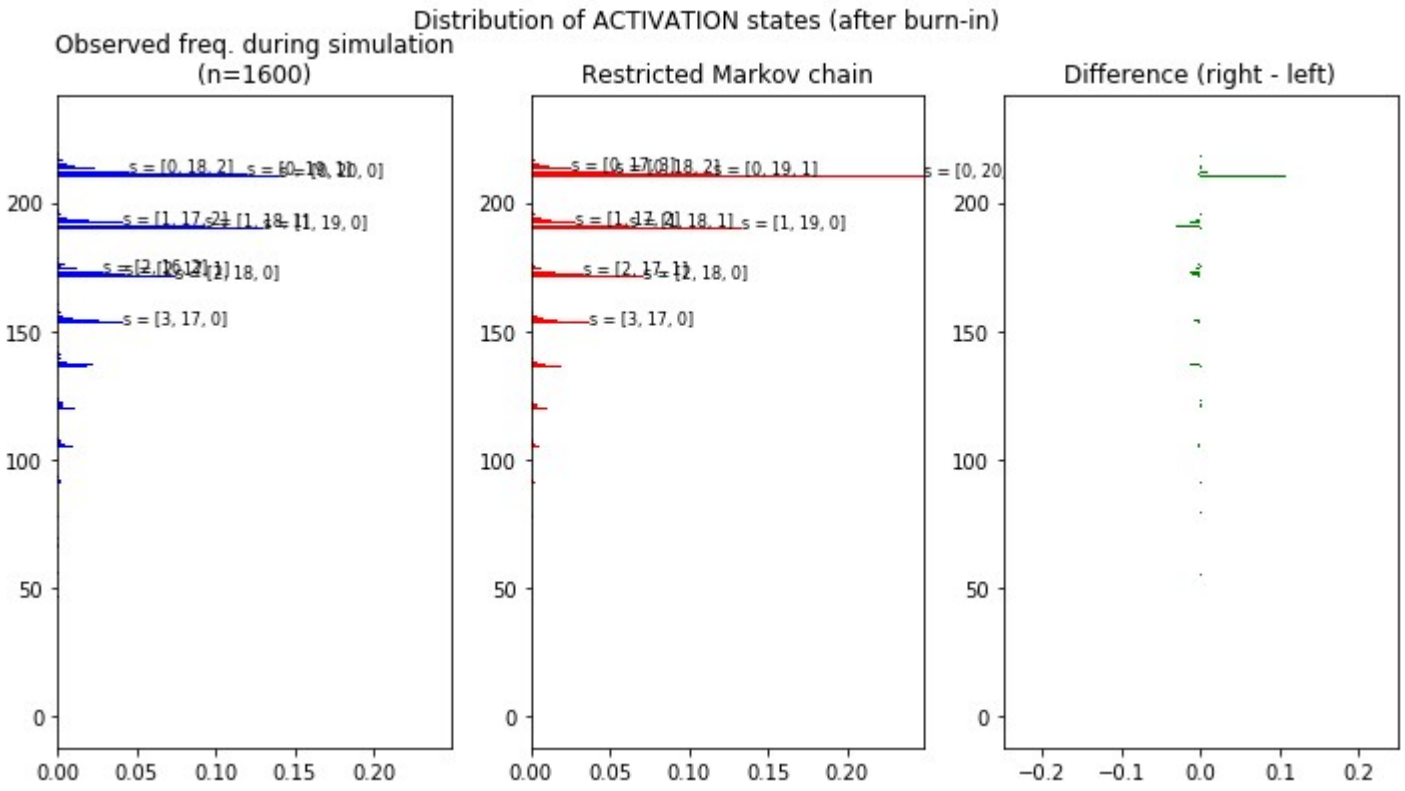

Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 16, 1]
s = [3, 16, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2

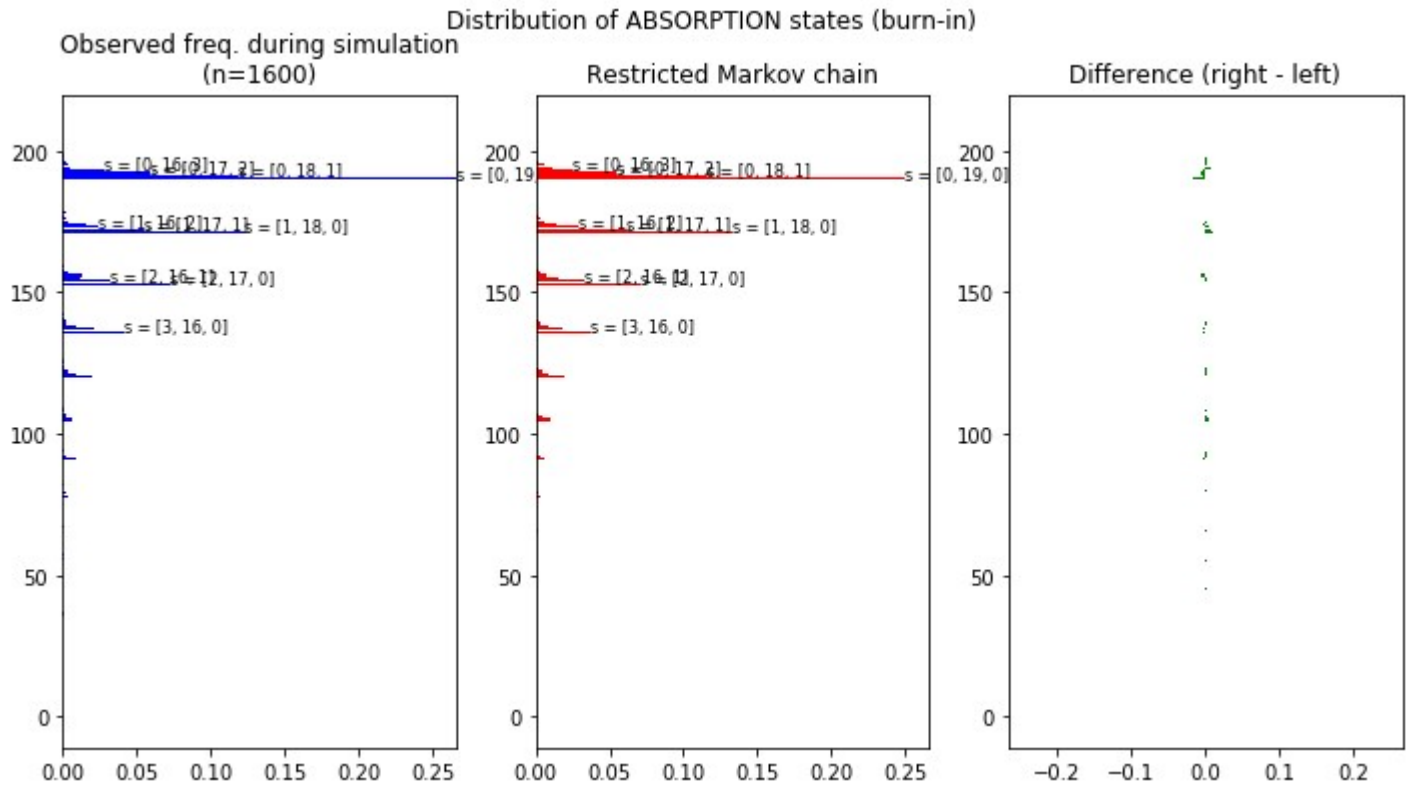


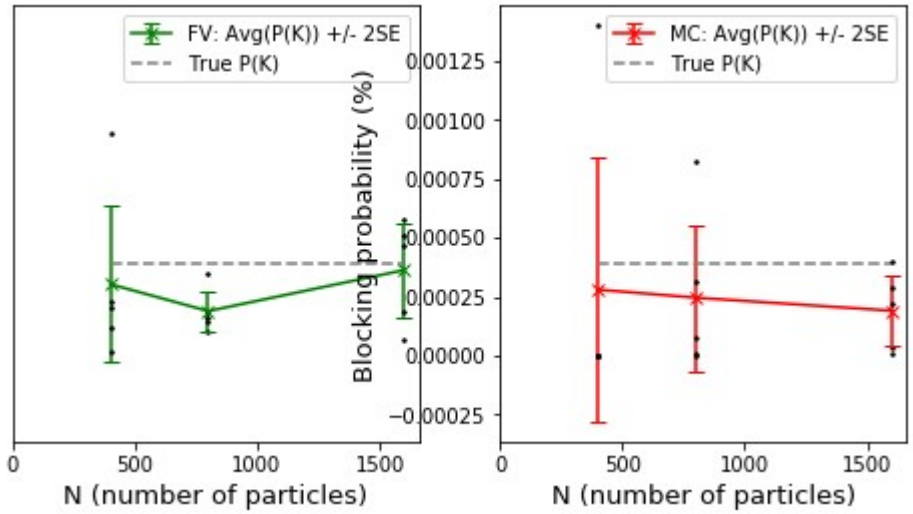
K=40, rhos=[0.4, 0.75, 0.35], N=1600, activation size=20, maxtime(1)=0.0, maxtime(N)=152.2, mean_lifetime=332.8(n=1600), finalize=ABS, seed=1757

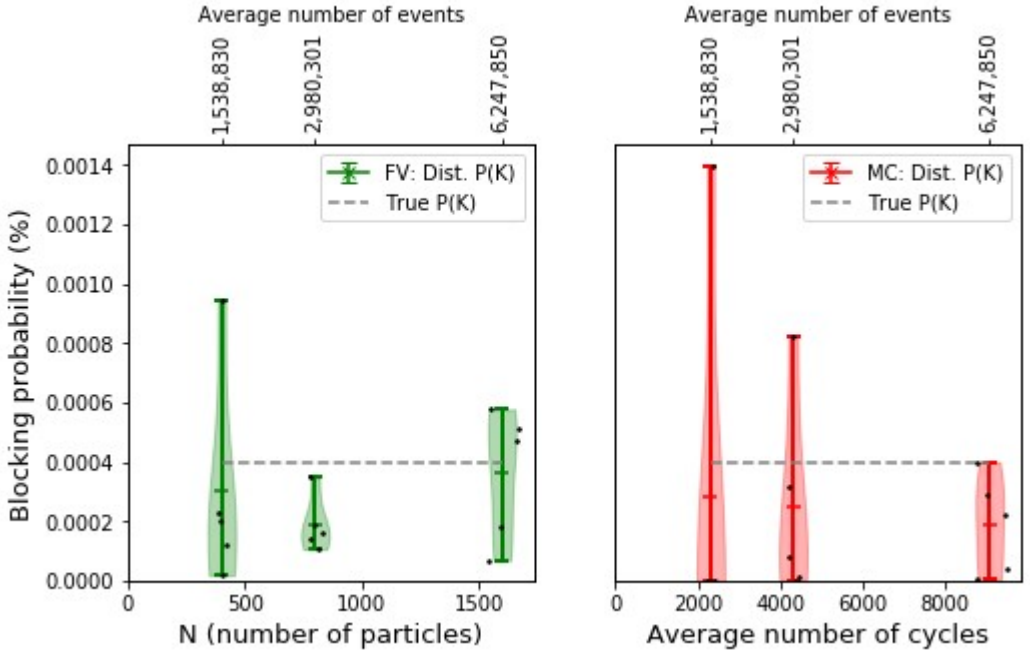


<matplotlib.figure.Figure at 0x277366b9c18>


Distribution of ACTIVATION states (after burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 2]
s = [1, 17, 2]
s = [3, 17, 0]
s = [0, 19, 1]
s = [1, 19, 0]
s = [2, 18, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
−0.2
−0.1
0.0
0.1
0.2


Distribution of ABSORPTION states (burn-in)
Observed freq. during simulation
(n=1600)
Restricted Markov chain
Difference (right - left)
s = [0, 18, 1]
s = [1, 18, 0]
s = [2, 17, 0]
s = [3, 16, 0]
s = [0, 19, 0]
0
50
100
150
200
0.00
0.05
0.10
0.15
0.20
0.25
−0.2
−0.1
0.0
0.1
0.2


FV: Avg(P(K)) +/- 2SE
True P(K)
Blocking probability (%)
0.00125
0.00100
0.00075
0.00050
0.00025
0.00000
−0.00025
0
500
1000
1500
N (number of particles)
MC: Avg(P(K)) +/- 2SE
True P(K)
0
500
1000
1500
N (number of particles)


Average number of events
1,538,830
2,980,301
6,247,850
FV: Dist. P(K)
True P(K)
Blocking probability (%)
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0
500
1000
1500
N (number of particles)
Average number of events
1,538,830
2,980,301
6,247,850
MC: Dist. P(K)
True P(K)
0
2000
4000
6000
8000
Average number of cycles

In [2]: