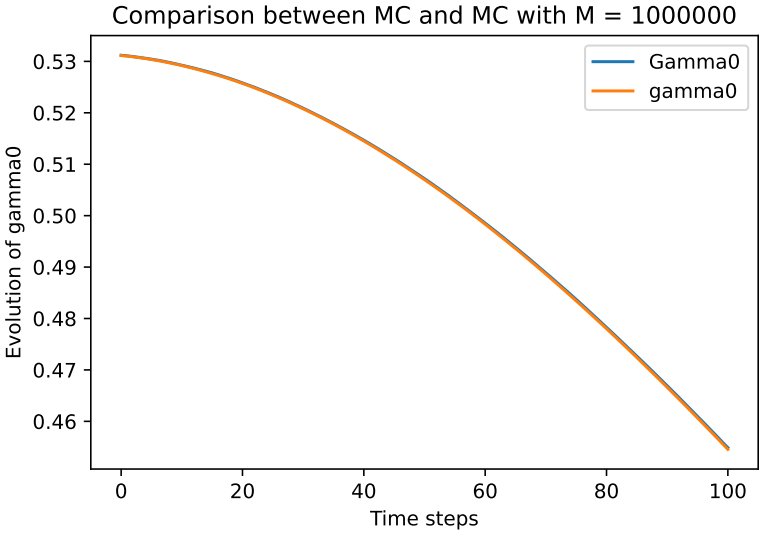
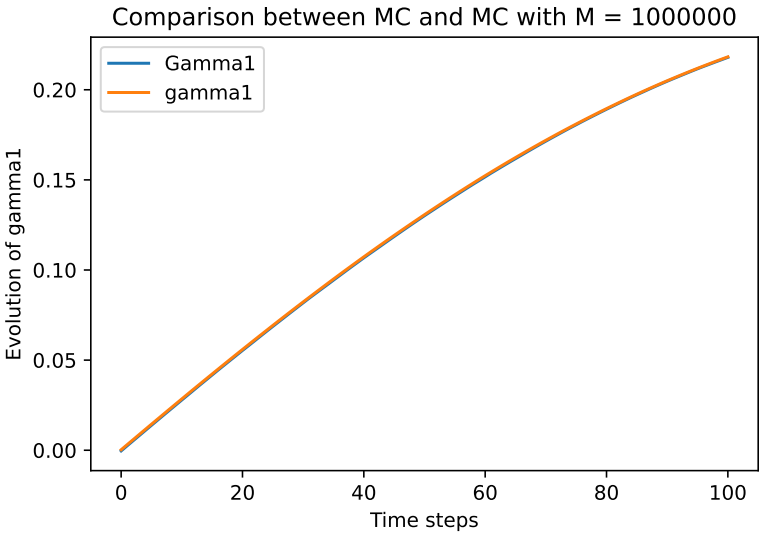
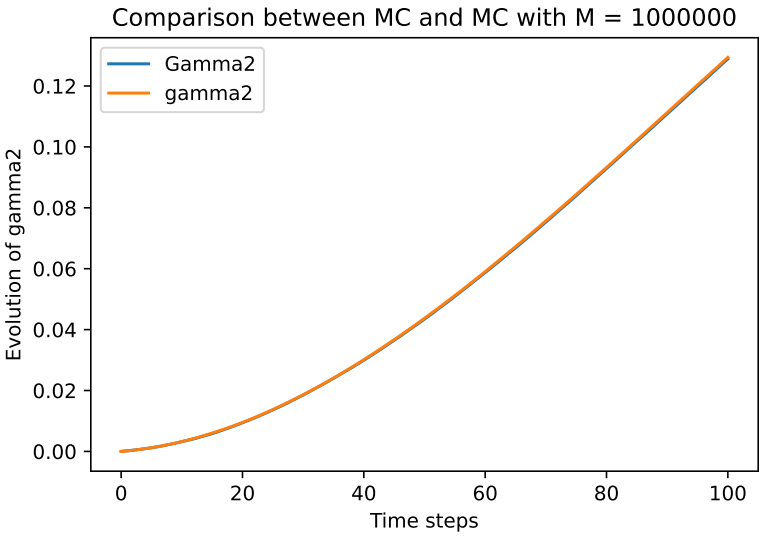
Numerical Study with T = 1, n = 3, sigma = 0.3

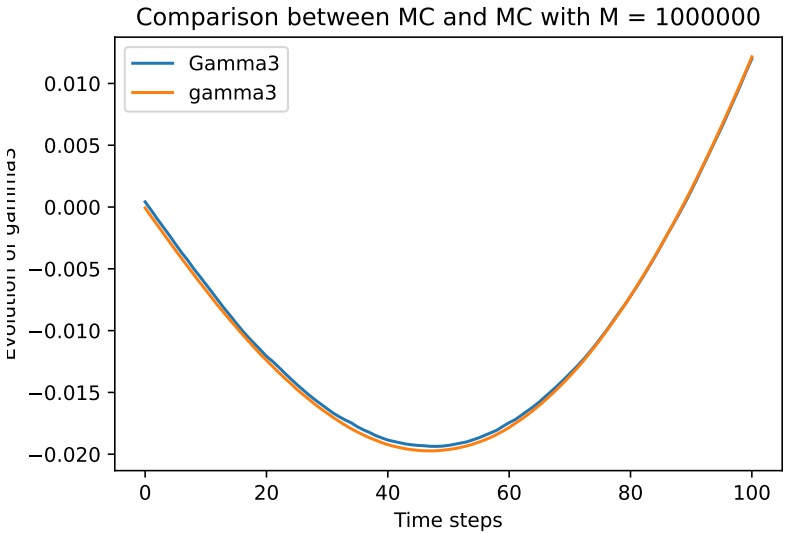
0.1 MC with 10^6 particels

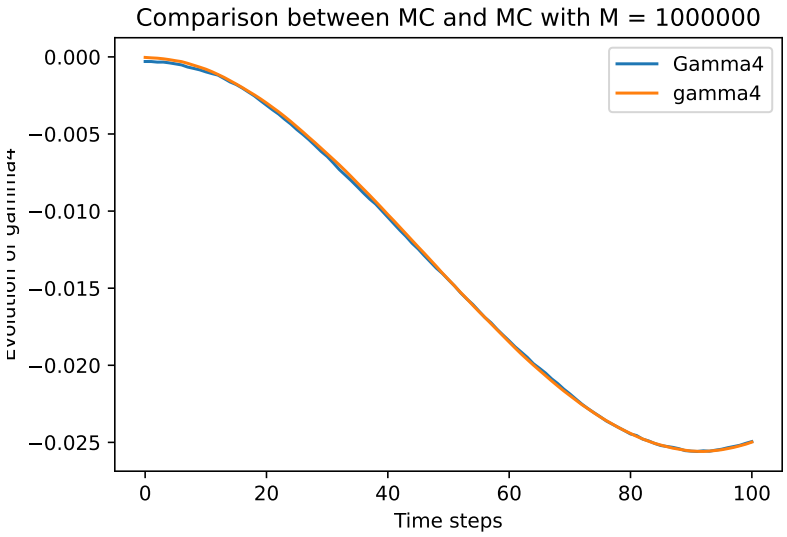
Euler - Monte Carlo execution time: 127.859375
Euler - Monte Carlo error: 0.001480500282752356

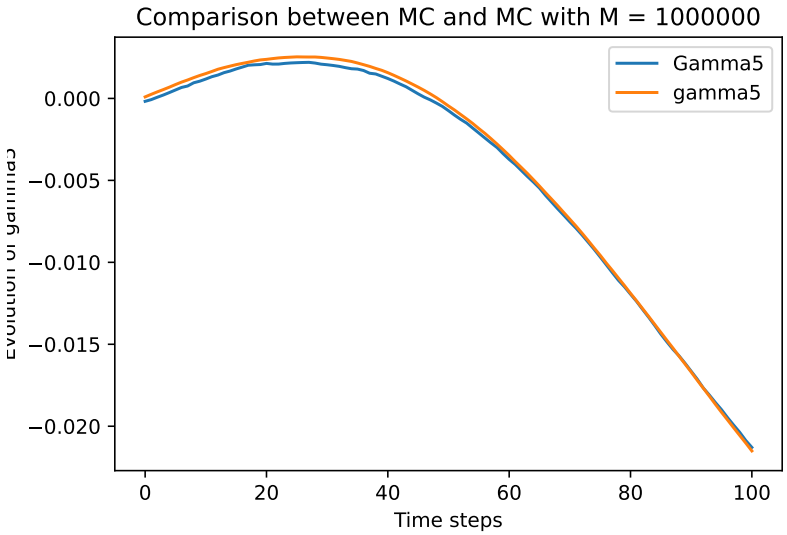



Comparison between MC and MC with M = 1000000
Gamma1
gamma1
Evolution of gamma1
0.00
0.05
0.10
0.15
0.20
0
20
40
60
80
100
Time steps


Comparison between MC and MC with M = 1000000
Gamma2
gamma2
Evolution of gamma2
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0
20
40
60
80
100
Time steps

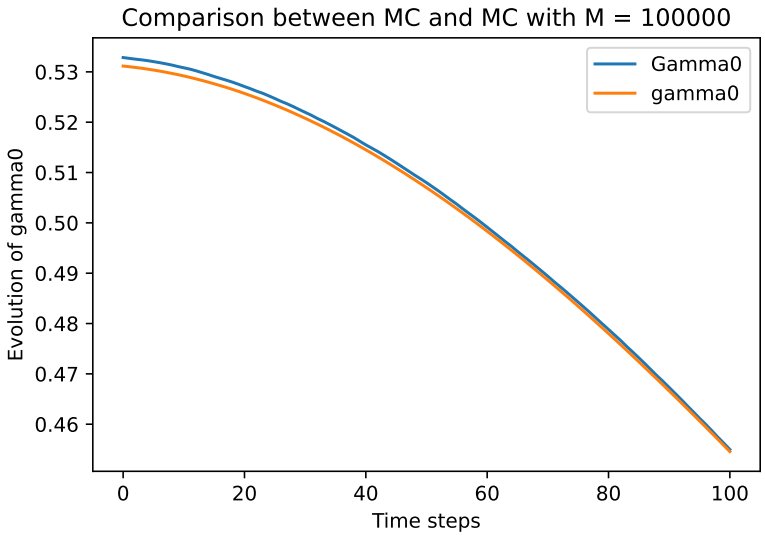

Comparison between MC and MC with M = 1000000
Gamma3
gamma3
0.010
0.005
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

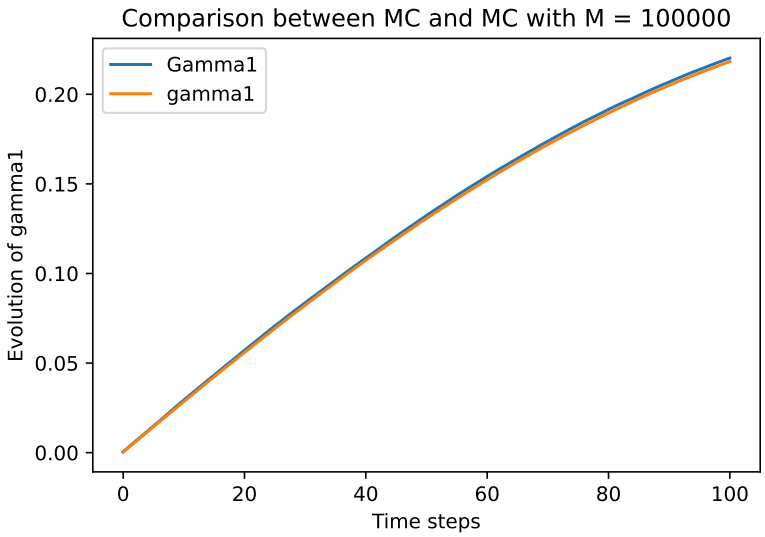

Comparison between MC and MC with M = 1000000
Gamma4
gamma4
0.000
−0.005
−0.010
−0.015
−0.020
−0.025
0
20
40
60
80
100
Time steps

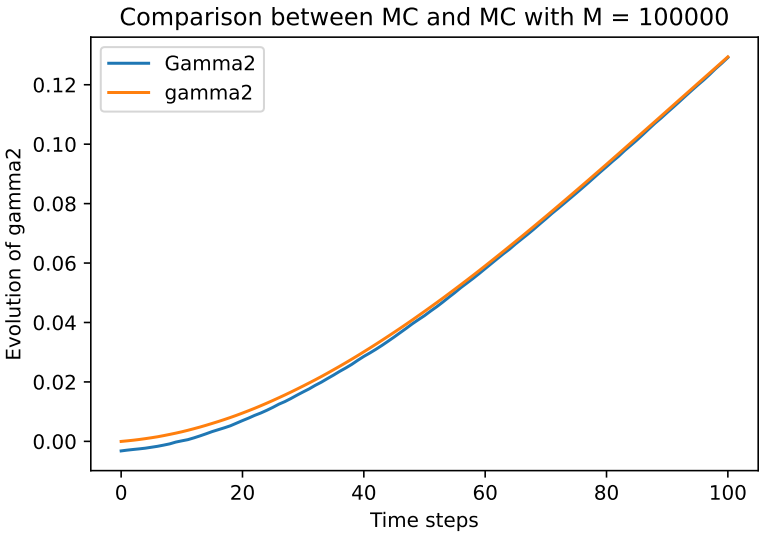

Comparison between MC and MC with M = 1000000
Gamma5
gamma5
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

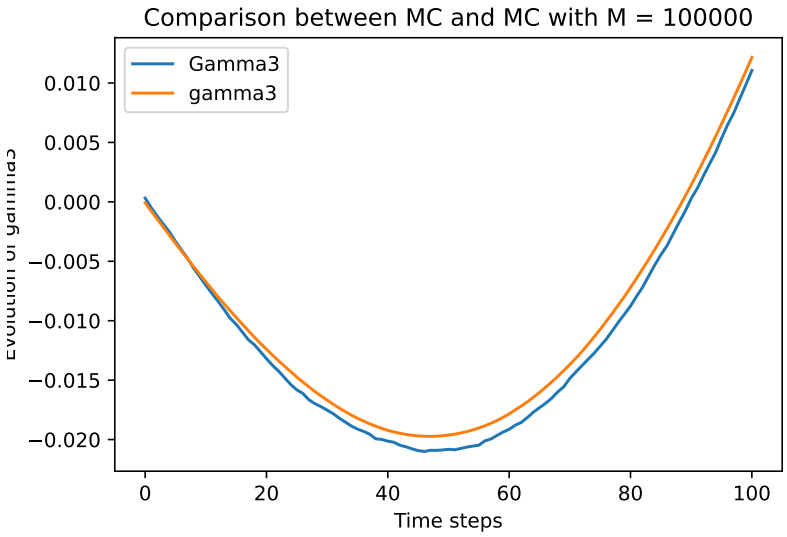
0.2 MC with 10^5 particels

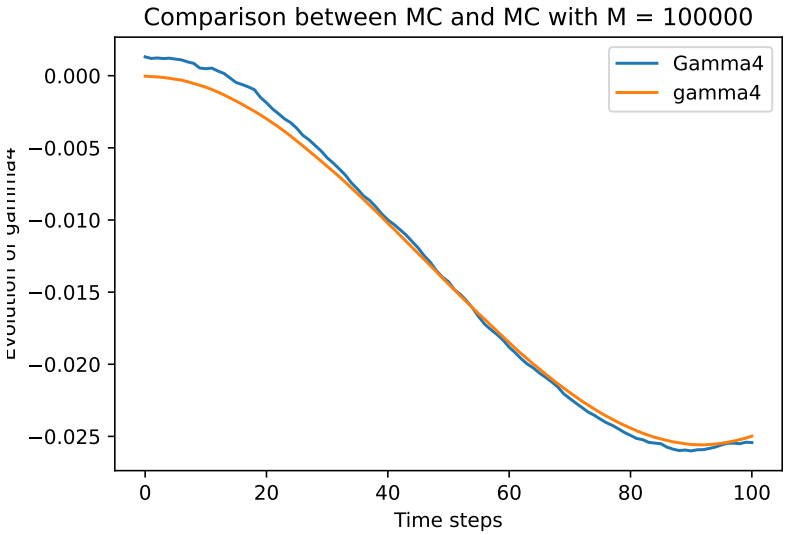
Euler - Monte Carlo execution time: 24.96875
Euler - Monte Carlo error: 0.0056881373542012215

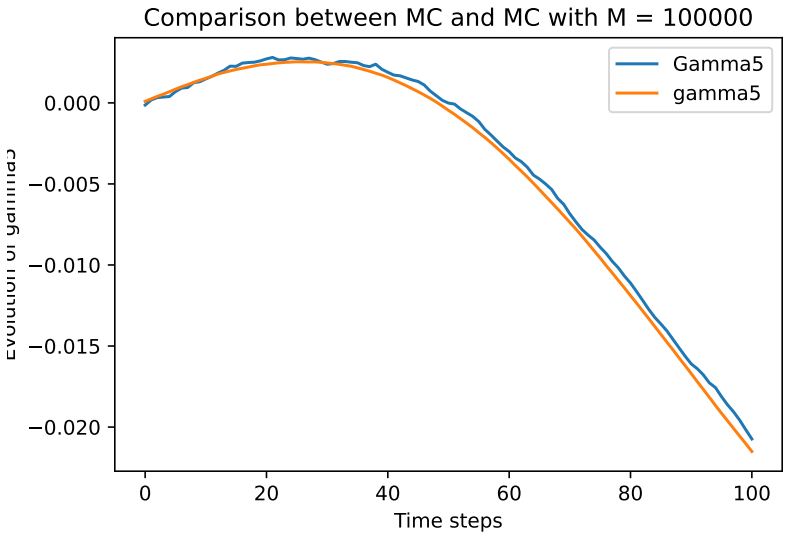





Comparison between MC and MC with M = 100000
Gamma2
gamma2
Evolution of gamma2
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
20
40
60
80
100
Time steps

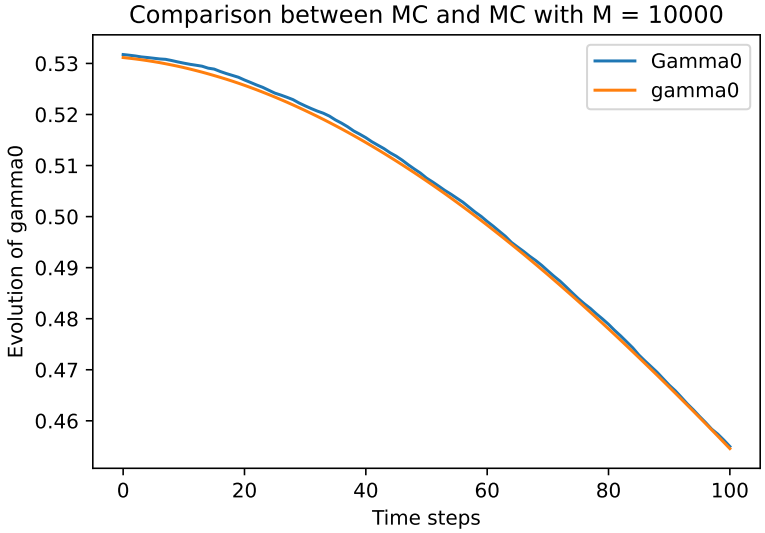

Comparison between MC and MC with M = 100000
Gamma3
gamma3
0.010
0.005
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

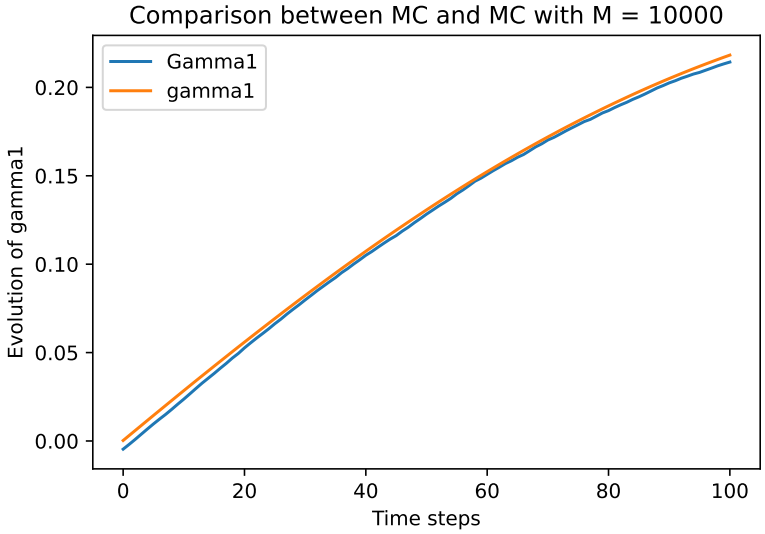

Comparison between MC and MC with M = 100000
Gamma4
gamma4
0.000
−0.005
−0.010
−0.015
−0.020
−0.025
0
20
40
60
80
100
Time steps

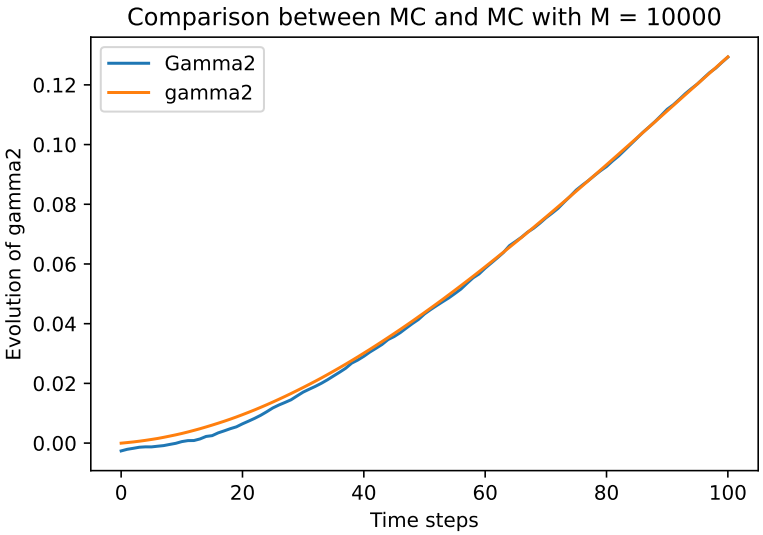

Comparison between MC and MC with M = 100000
Gamma5
gamma5
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

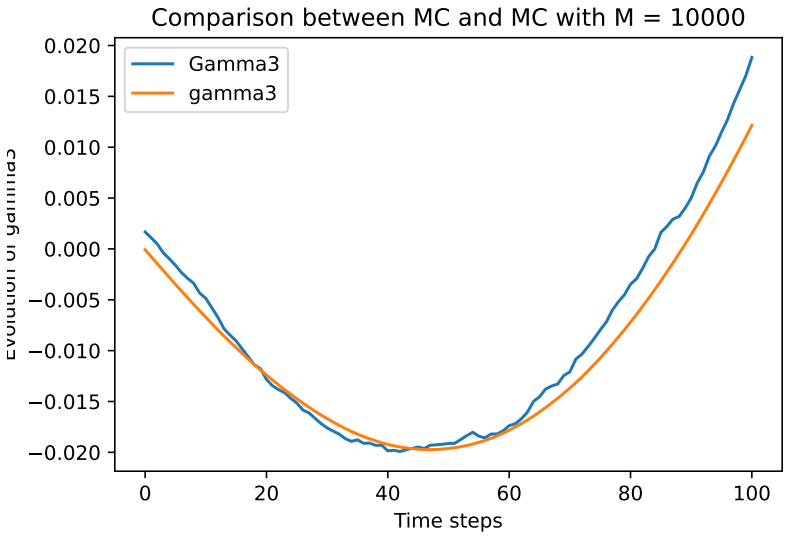
0.3 MC with 10^4 particels

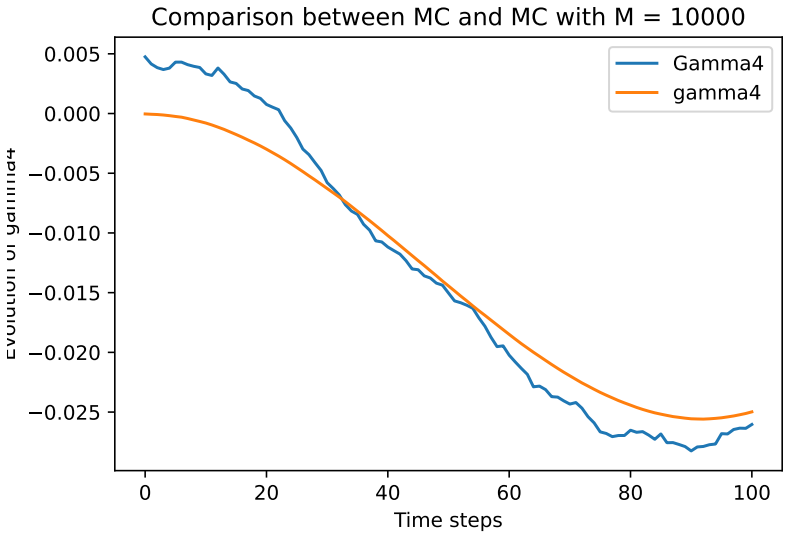
Euler - Monte Carlo execution time: 2.484375
Euler - Monte Carlo error: 0.011473528868816807

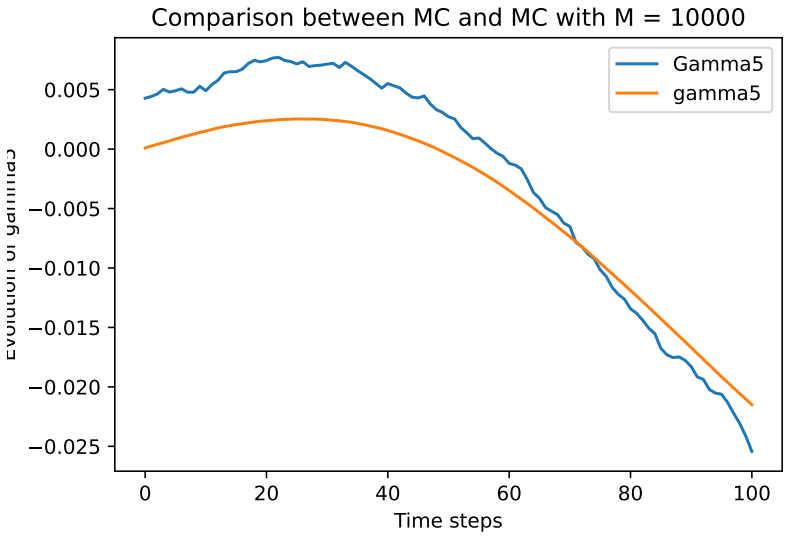





Comparison between MC and MC with M = 10000
Gamma2
gamma2
Evolution of gamma2
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
20
40
60
80
100
Time steps

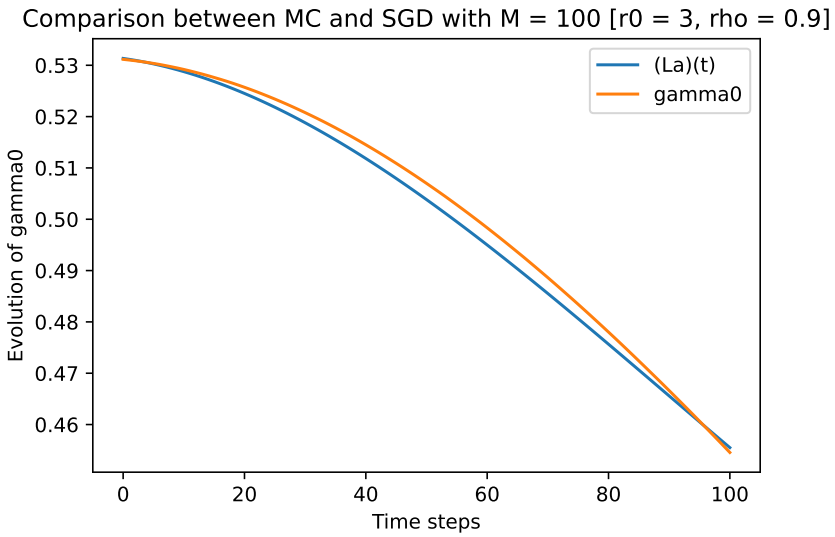

Comparison between MC and MC with M = 10000
Gamma3
gamma3
0.020
0.015
0.010
0.005
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

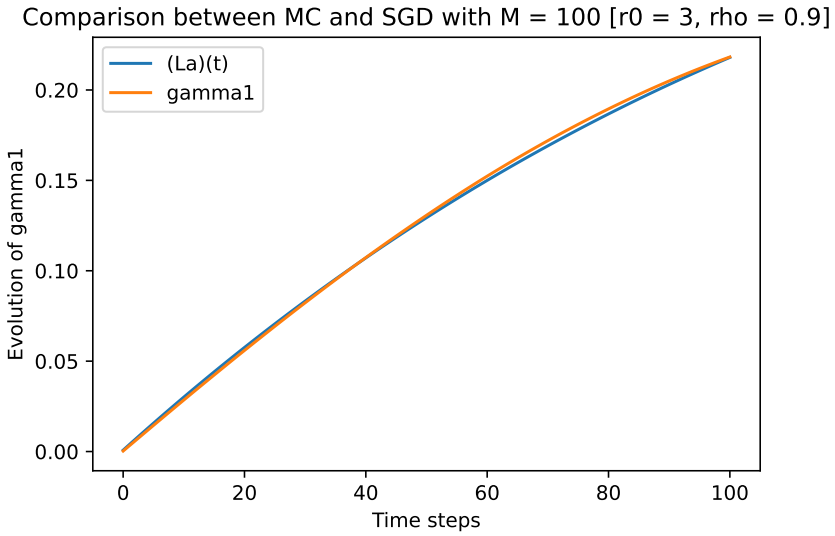

Comparison between MC and MC with M = 10000
Gamma4
gamma4
0.005
0.000
−0.005
−0.010
−0.015
−0.020
−0.025
0
20
40
60
80
100
Time steps

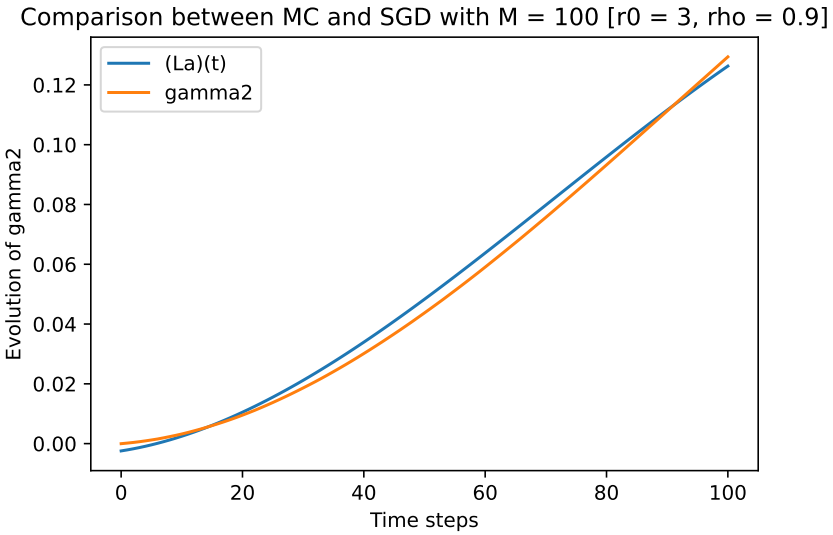

Comparison between MC and MC with M = 10000
Gamma5
gamma5
0.005
0.000
−0.005
−0.010
−0.015
−0.020
−0.025
0
20
40
60
80
100
Time steps

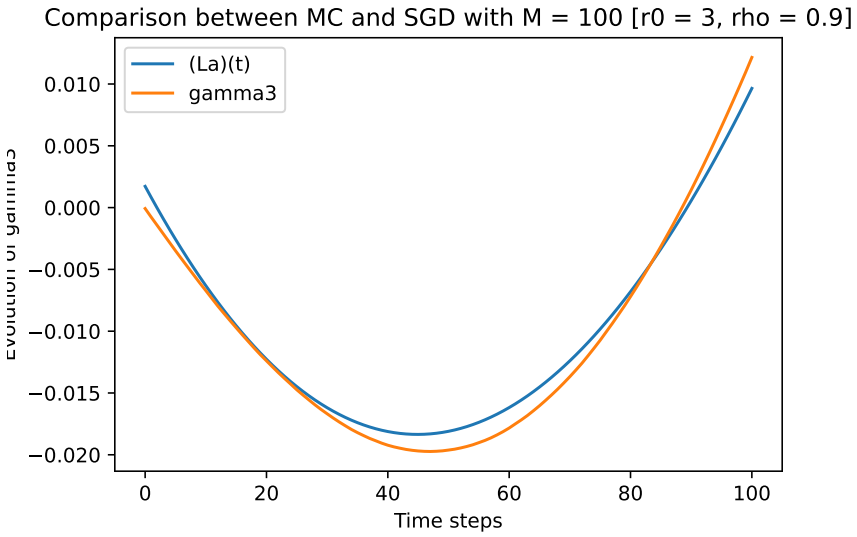
0.4 SGD with M = 100

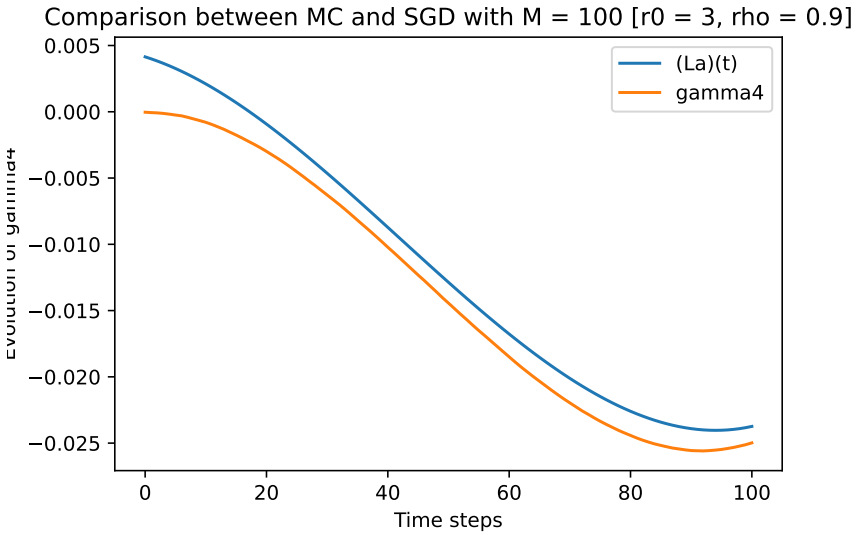
SGD execution time: 13.65625
SGD steps: 150

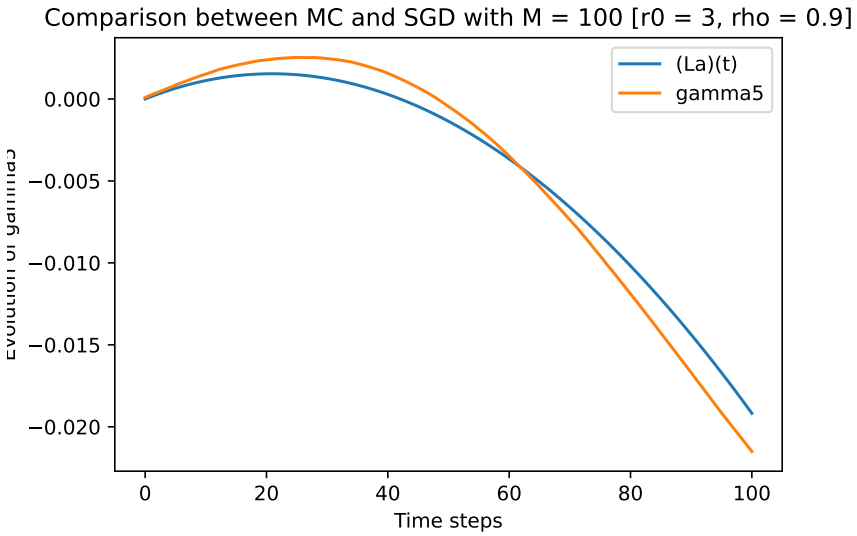





Comparison between MC and SGD with M = 100 [r0 = 3, rho = 0.9]
(La)(t)
gamma2
Evolution of gamma2
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
20
40
60
80
100
Time steps

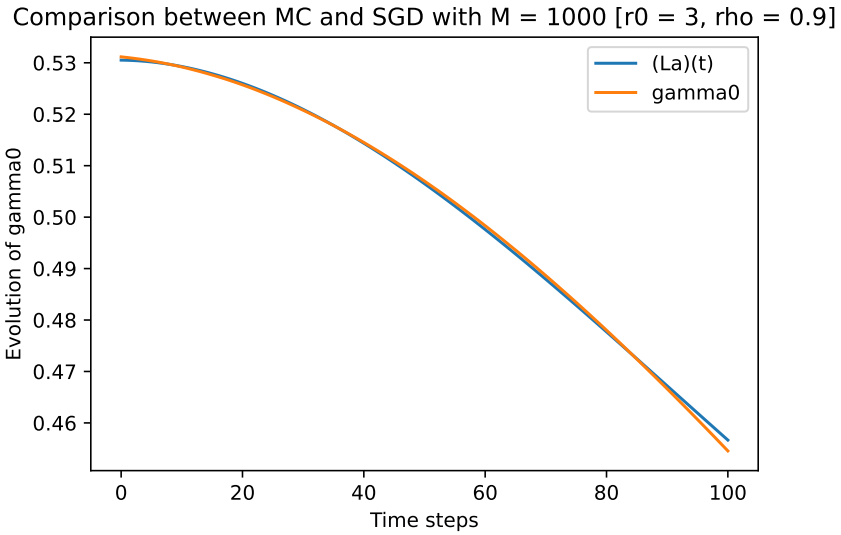

Comparison between MC and SGD with M = 100 [r0 = 3, rho = 0.9]
(La)(t)
gamma3
0.010
0.005
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

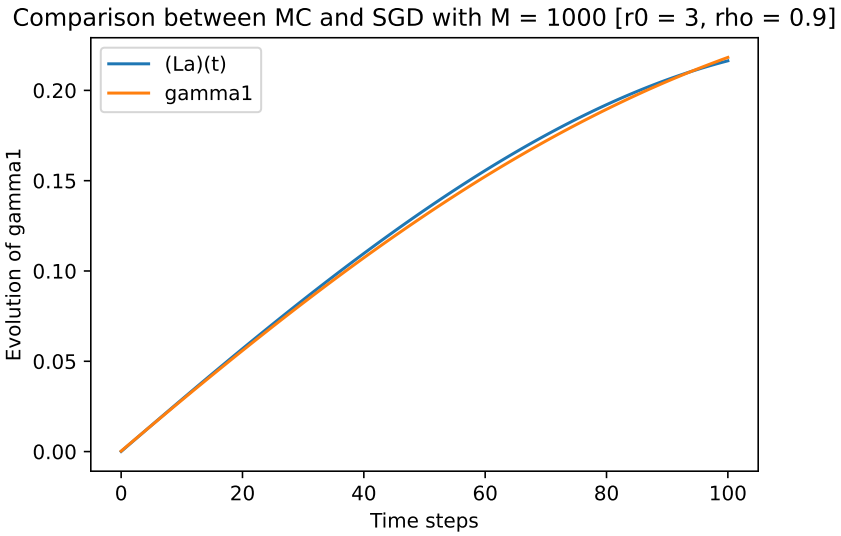


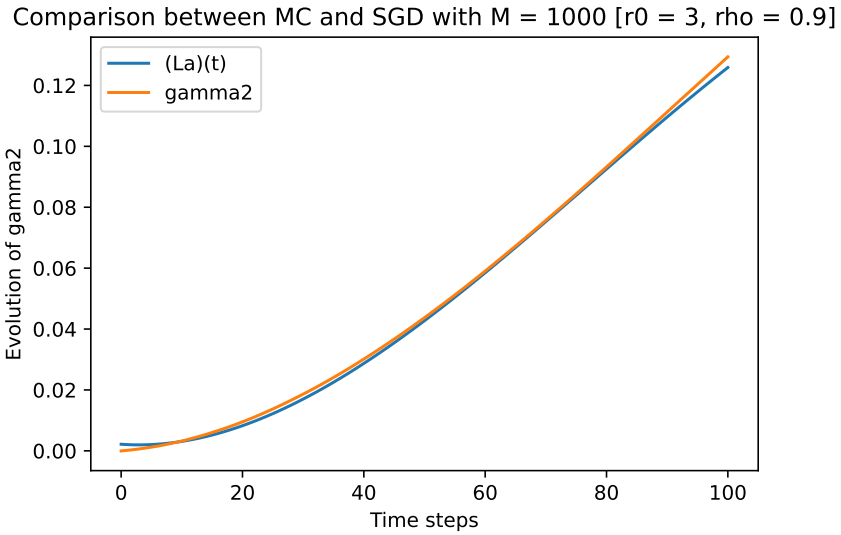


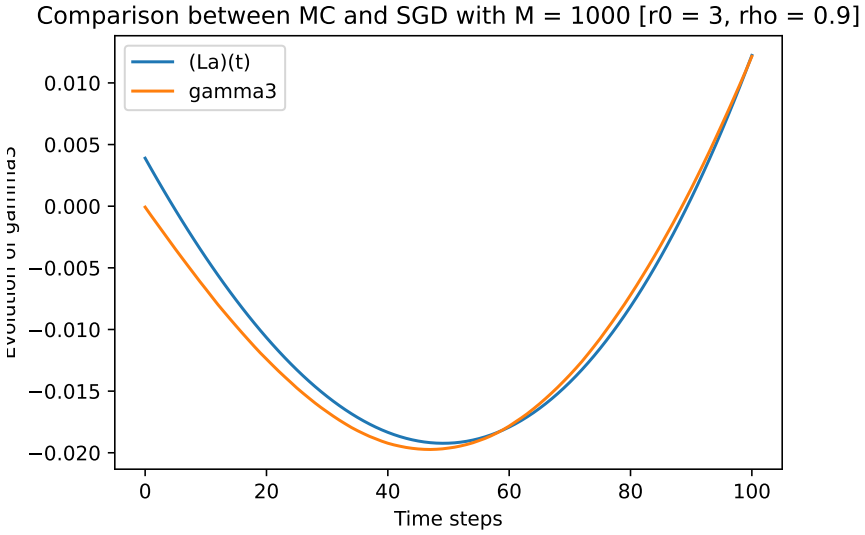
0.5 SGD with M = 1000

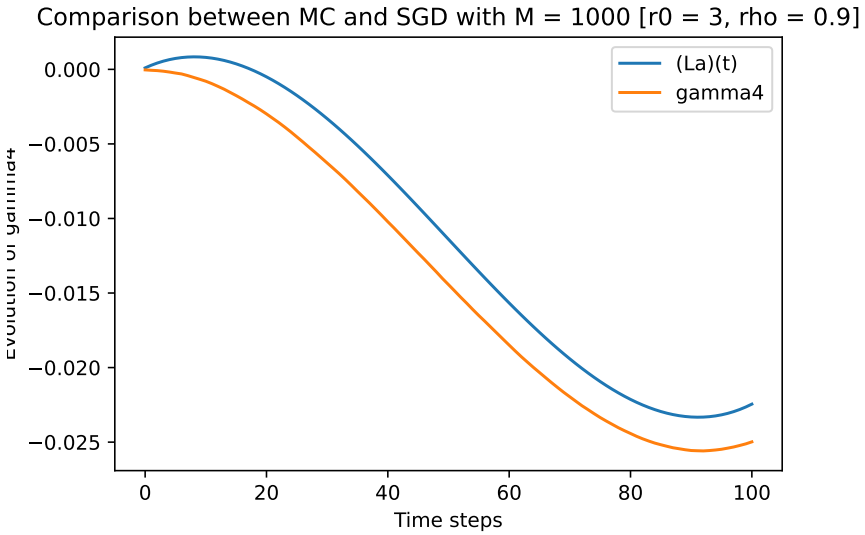
SGD execution time: 42.609375
SGD steps: 60

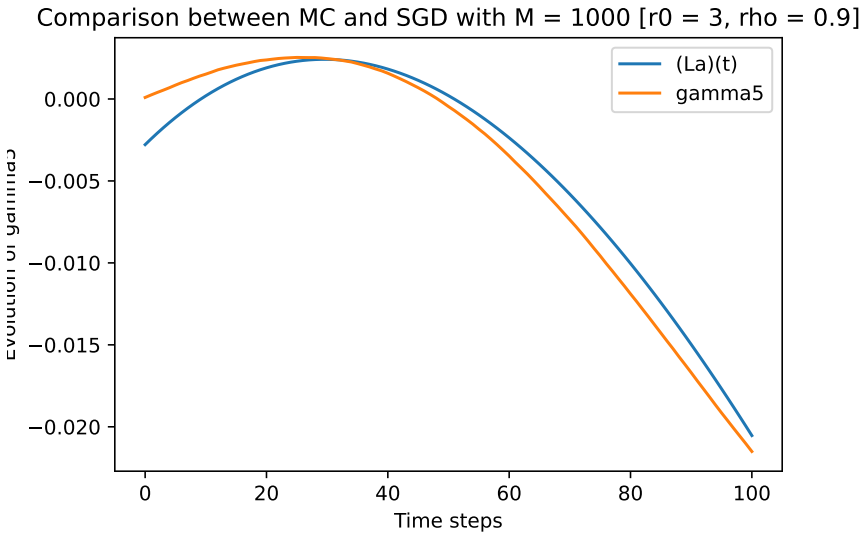

Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma0
Evolution of gamma0
0.53
0.52
0.51
0.50
0.49
0.48
0.47
0.46
0
20
40
60
80
100
Time steps


Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma1
Evolution of gamma1
0.20
0.15
0.10
0.05
0.00
0
20
40
60
80
100
Time steps


Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma2
Evolution of gamma2
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
20
40
60
80
100
Time steps


Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma3
0.010
0.005
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps


Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma4
0.000
−0.005
−0.010
−0.015
−0.020
−0.025
0
20
40
60
80
100
Time steps


Comparison between MC and SGD with M = 1000 [r0 = 3, rho = 0.9]
(La)(t)
gamma5
0.000
−0.005
−0.010
−0.015
−0.020
0
20
40
60
80
100
Time steps

0.6 Tables

	MC 10^6	MC 10^5	MC 10^4	SGD 100	SGD 1000
time	127.86	24.97	2.48	13.66	42.61
error	0.0015	0.0057	0.011	0.001	0.001
steps	/	/	/	150	60

Tabella 1: Comparisons