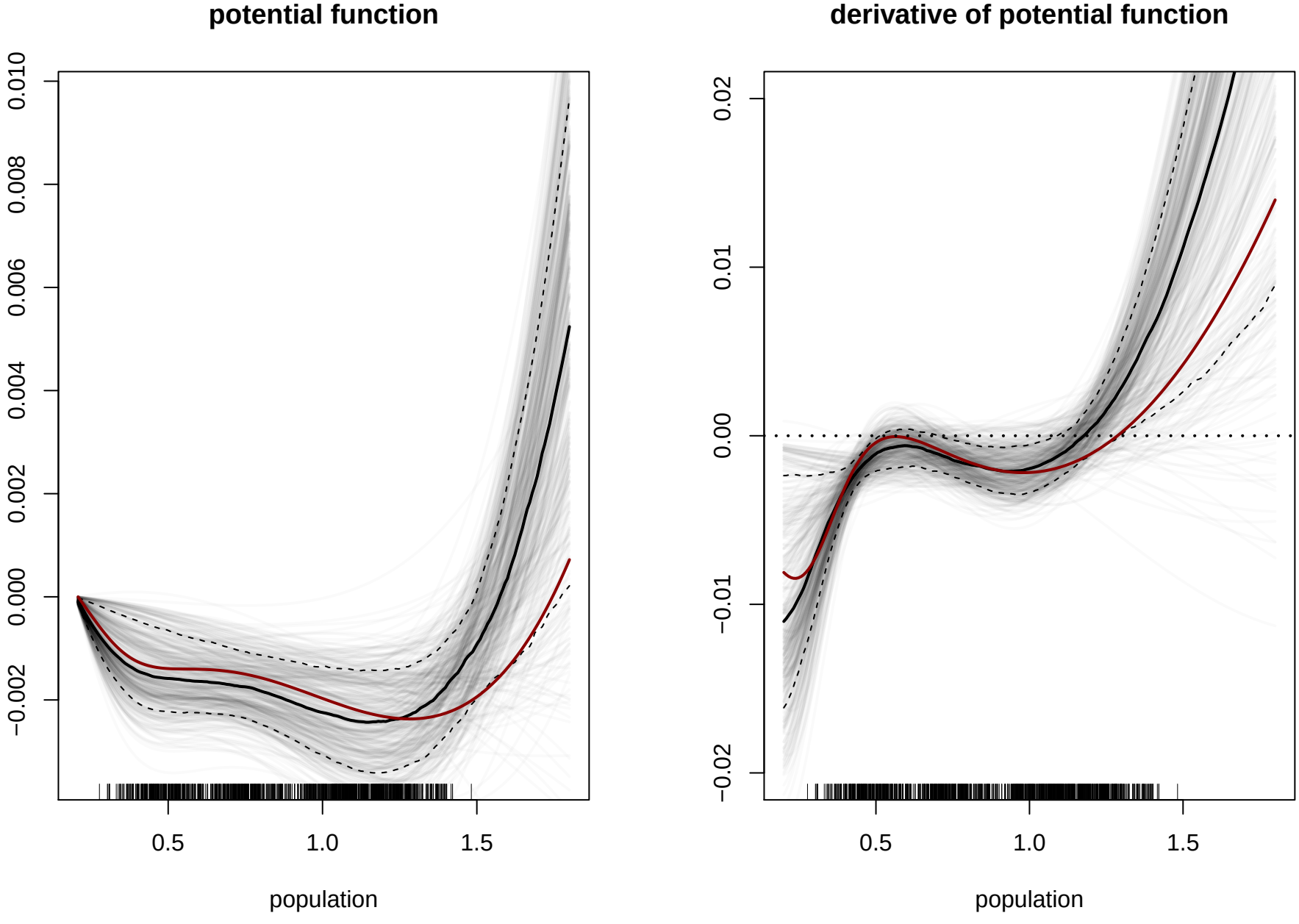
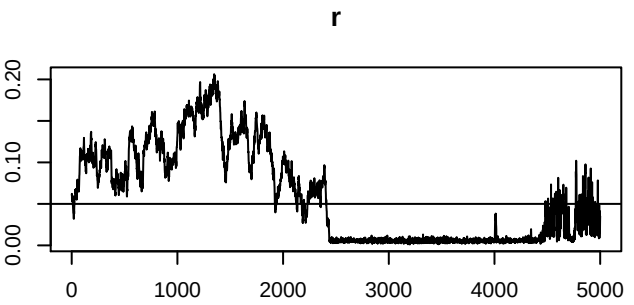
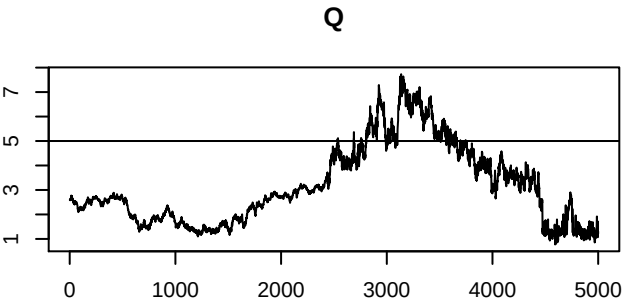
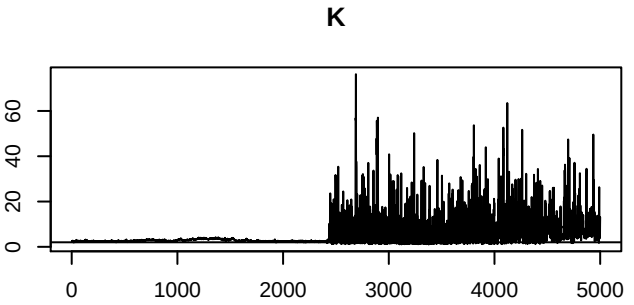
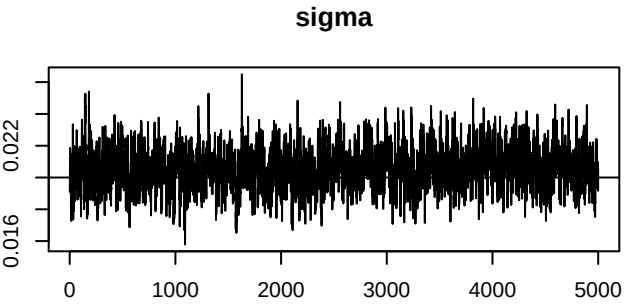
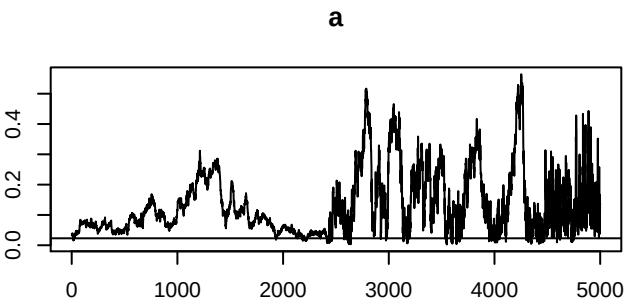

potential function
0.010
0.008
0.006
0.004
0.002
0.000
−0.002
0.5
1.0
1.5
population
derivative of potential function
0.02
0.01
0.00
−0.01
−0.02
0.5
1.0
1.5
population

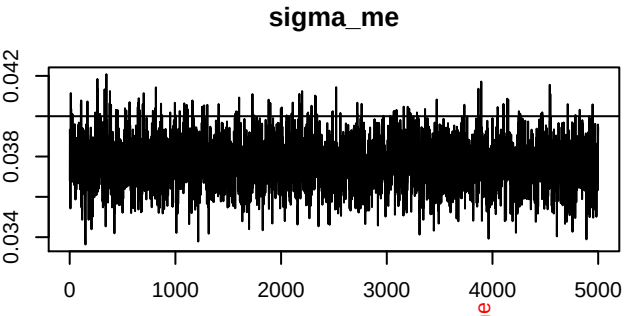

r
0.00
0.10
0.20
0
1000
2000
3000
4000
5000

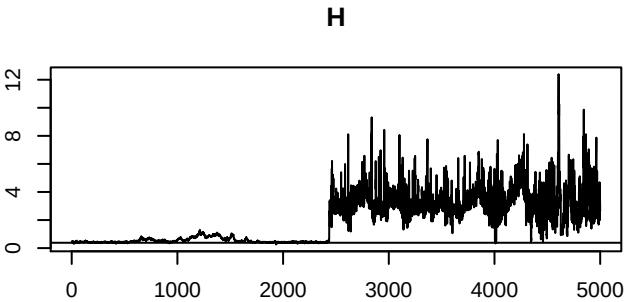

Q
1
3
5
7
0
1000
2000
3000
4000
5000

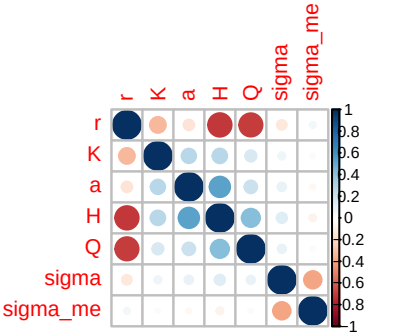

K
0
20
40
60
0
1000
2000
3000
4000
5000

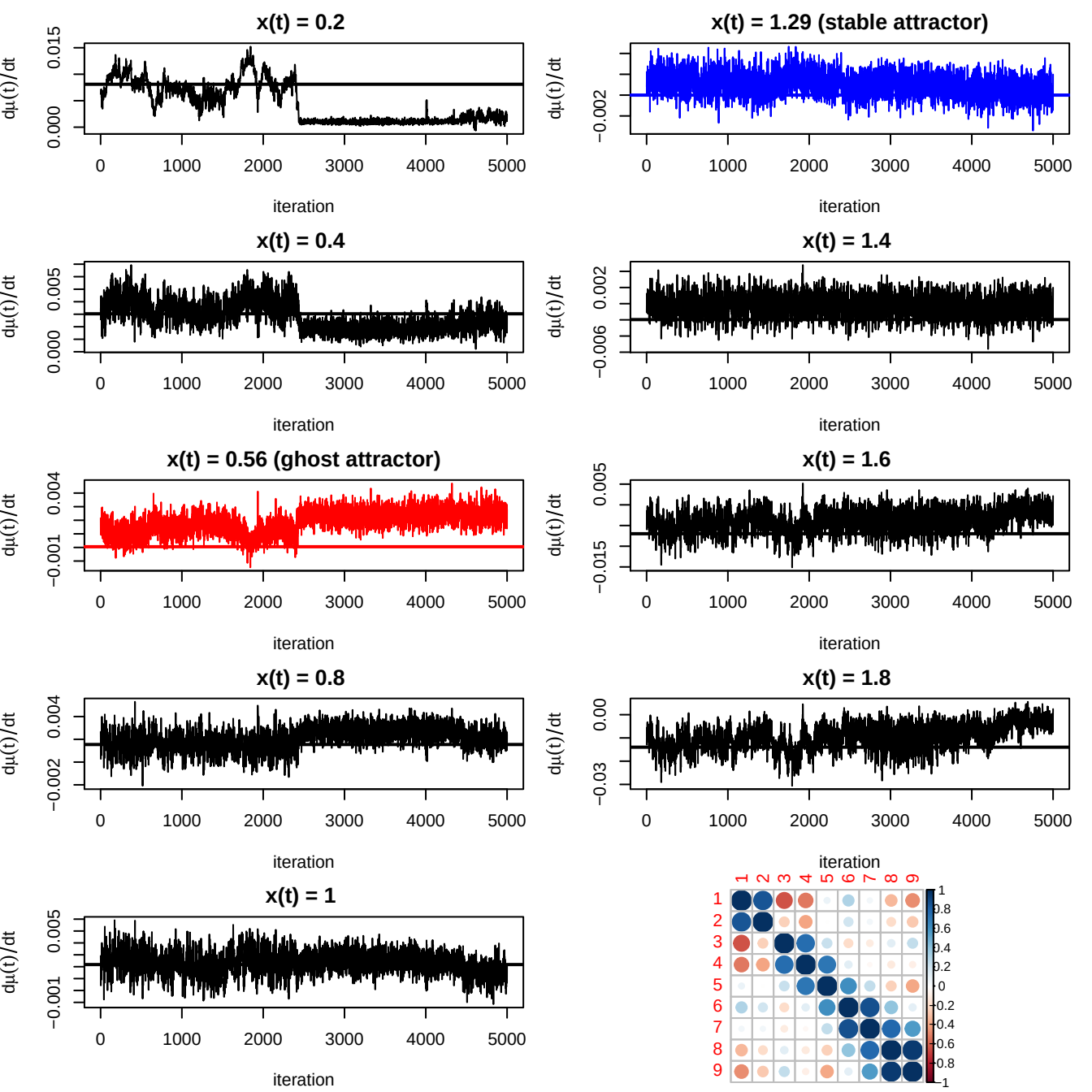

sigma
0.016
0.022
0
1000
2000
3000
4000
5000

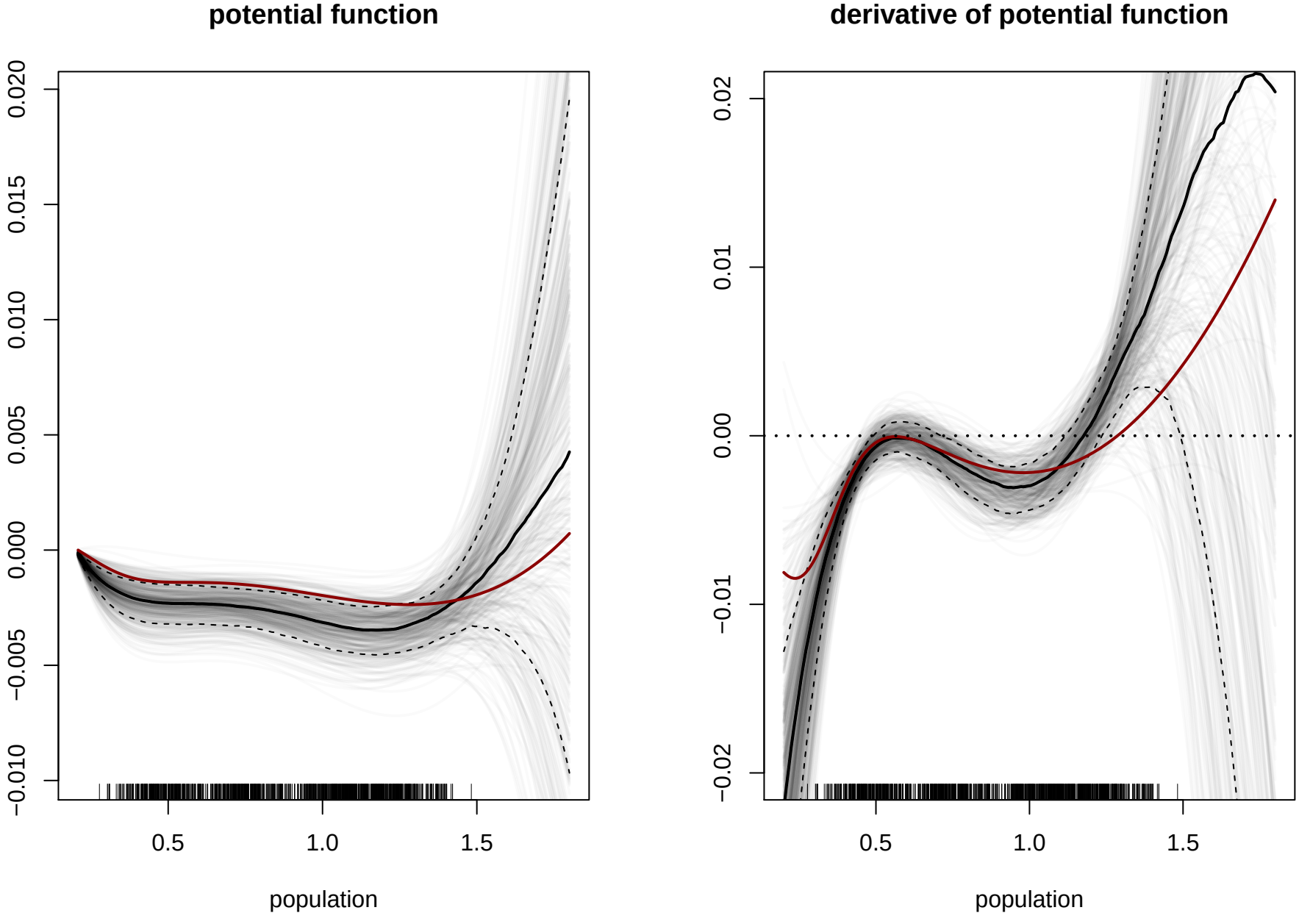

a
0.0
0.2
0.4
0
1000
2000
3000
4000
5000

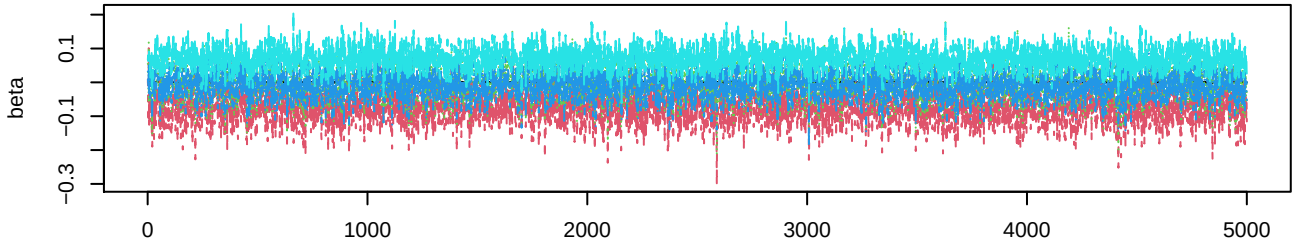

sigma_me
0.034
0.038
0.042
0
1000
2000
3000
4000
5000

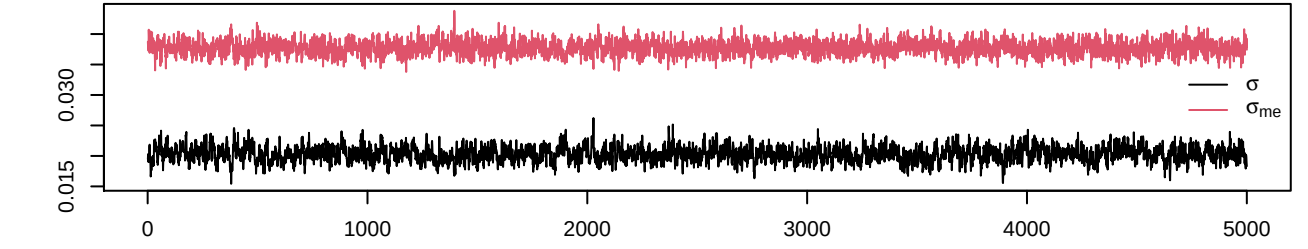

H
0
4
8
12
0
1000
2000
3000
4000
5000

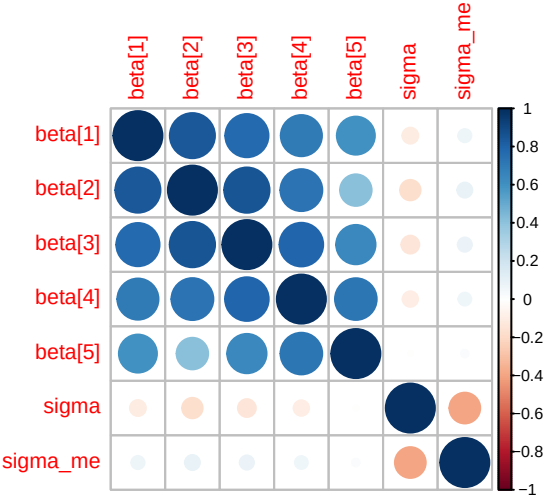

r
K
a
H
Q
sigma
sigma_me
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

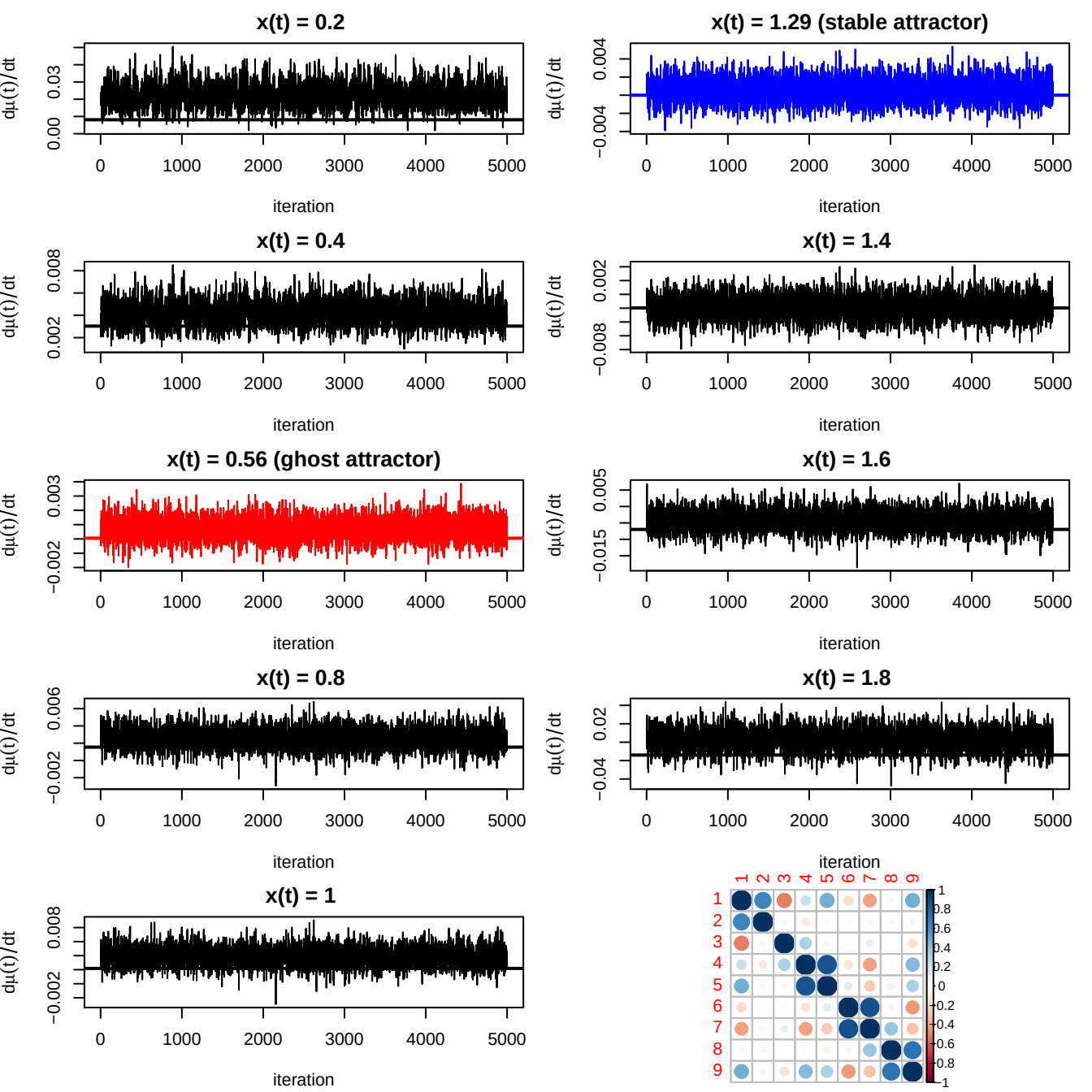

x(t) = 0.2
x(t) = 1.29 (stable attractor)
x(t) = 0.4
x(t) = 1.4
x(t) = 0.56 (ghost attractor)
x(t) = 1.6
x(t) = 0.8
x(t) = 1.8
x(t) = 1
dμ(t)/dt
iteration
0
1000
2000
3000
4000
5000
1
2
3
4
5
6
7
8
9
0.8
0.6
0.4
0.2
−0.2
−0.4
−0.6
−0.8
−1


potential function
0.020
0.015
0.010
0.005
0.000
−0.005
−0.010
0.5
1.0
1.5
population
derivative of potential function
0.02
0.01
0.00
−0.01
−0.02
0.5
1.0
1.5
population


beta
0.1
−0.1
−0.3
0
1000
2000
3000
4000
5000


0.030
0.015
σ
σme
0
1000
2000
3000
4000
5000


beta[1]
beta[2]
beta[3]
beta[4]
beta[5]
sigma
sigma_me
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1


x(t) = 0.2
x(t) = 1.29 (stable attractor)
x(t) = 0.4
x(t) = 1.4
x(t) = 0.56 (ghost attractor)
x(t) = 1.6
x(t) = 0.8
x(t) = 1.8
x(t) = 1
dμ(t)/dt
iteration
0
1000
2000
3000
4000
5000