

## Comparison\_1d\_vs\_100d\_RicattiEqn\_solver

September 18, 2020

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[8]: import time
import numpy as np
from scipy import linalg as la

A=1
B=0.3
#D=0.5
#E=0.2
Q=1.0
#Qbar=1.0
R=0.5
#Rbar=0.5

avg1=0
avg2=0
A_m=np.random.rand(100,100)
B_m=np.random.rand(100,100)
#D_m=np.random.rand(100,100)
#E_m=np.random.rand(100,100)
Q_m=(Q/100)*np.eye(100)+(1/100**2)*(1)*np.ones((100,100))
R_m=(R/100)*np.eye(100)+(1/100**2)*(0.5)*np.ones((100,100))
#Rbar_m=

for i in range(500):
    start1 = time.time()
    S1=la.solve_discrete_are(A,B,Q,R)
    G1=1/(B*S1*B+R)*(B)*S1*A
    end1 = time.time()

    avg1=avg1+(end1- start1)

for i in range(500):
    start2 = time.time()
    S1=la.solve_discrete_are(A_m,B_m,Q_m,R_m)
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G1=1/(B_m*S1*B_m+R_m)*(B_m)*S1*A_m
end2 = time.time()
#print('100d time',end2- start2)
avg2=avg2+(end2- start2)

avg1=avg1/500
avg2=avg2/500
print('1d time in sec',avg1)
print('100d time in sec',avg2)
print('the ratio',avg2/avg1)

```

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1d time in sec 0.000690422534942627
100d time in sec 0.08888740634918213
the ratio 128.7434894583337

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[ ]: