```
%stabilizzazione quadratica TC
%A(p)=[1 0.5;1 p]; p=[-0.4 0.4]

mu=0.4;
A1=[1 0.5;1 -mu];
A2=[1 0.5;1 mu];
B=[1;1];
n=2;
m=1;
%u=Kx

Q=sdpvar(n);
Y=sdpvar(m,n,'full');

F=[Q>=0];
F=[F,A1*Q+B*Y+Q*A1'+Y'*B'<=0];
F=[F,A2*Q+B*Y+Q*A2'+Y'*B'<=0];
diagnostic=optimize(F);
check(F)
Q=value(Q);
Y=value(Y);
P=inv(Q)
K=Y*P

eig(Q)
eig(A1*Q+B*Y+Q*A1'+Y'*B')
eig(A2*Q+B*Y+Q*A2'+Y'*B')

alfa1=0.3;
alfa2=0.7;
Aalfa=alfa1*A1+alfa2*A2;
eig(Aalfa+B*K)

%%%%%%%%%%%%%
%x(k+1)=A(p)x(k)+B(p)u(k)  T.D.
%Progettare u=Kx tale che il sistema a ciclo chiuso e' quadraticamente stabile
%A(p)=[1.2 0 -0.5;0.4 p 0;2 1 0.4]; p\in [-0.2 0.2]
%B(p)=[p 0 1]';

mu=0.2; %0.3 non quadraticamente stabilizzabile;
A1=[1.2 0 -0.5;0.4 -mu 0;2 1 0.4];
A2=[1.2 0 -0.5;0.4 mu 0;2 1 0.4];
eig(A1)
eig(A2)

B1=[-mu 0 1]';
B2=[mu 0 1]';

n=3;
m=1;

Q=sdpvar(n);
Y=sdpvar(m,n,'full');

F=[Q>=0];
F=[F,[-Q A1*Q+B1*Y;Q*A1'+Y'*B1' -Q]<=0];
F=[F,[-Q A2*Q+B2*Y;Q*A2'+Y'*B2' -Q]<=0];
```

```
diagnostic=optimize(F);
check(F)
Q=value(Q);
Y=value(Y);
P=inv(Q)
K=Y*P

eig(Q)

eig([-Q A1*Q+B1*Y;Q*A1'+Y'*B1' -Q])
eig([-Q A2*Q+B2*Y;Q*A2'+Y'*B2' -Q])

alfa1=1;
alfa2=0;
Aalfa=alfa1*A1+alfa2*A2;
Balfa=alfa1*B1+alfa2*B2;
eig(Aalfa+Balfa*K)

alfa1=0.2;
alfa2=0.8;
Aalfa=alfa1*A1+alfa2*A2;
Balfa=alfa1*B1+alfa2*B2;
eig(Aalfa+Balfa*K)
```