
```

function main
global a b k;
c = [1 1 -1];
a = [0 1 0;0 0 1;-1 1 1];
b = [0;0;1];
q = [1 0 0;0 1 0;0 0 1];
r = 0.01;
[k,P,polesopt] = lqr(a,b,q,r,0)
X0=[1,2,0];
[t,xf] = ode45(@sub,0:0.01:10,X0);%solve ODE
figure(1)
plot(t,xf*c','r');
hold on
figure(2)
plot(t,xf*k','r');
hold on
%end

```

```

function dx = sub(t,x);
    global a b k;
    %u = 1;
    u=-k*x;
    dx = zeros(3,1);
    dx(1) = a(1,:)*x+b(1)*u;
    dx(2) = a(2,:)*x+b(2)*u;
    dx(3) = a(3,:)*x+b(3)*u;

```

```

k =

    9.0499    19.4595    12.8287

```

```

P =

    1.8652    1.1988    0.0905
    1.1988    2.0830    0.1946
    0.0905    0.1946    0.1283

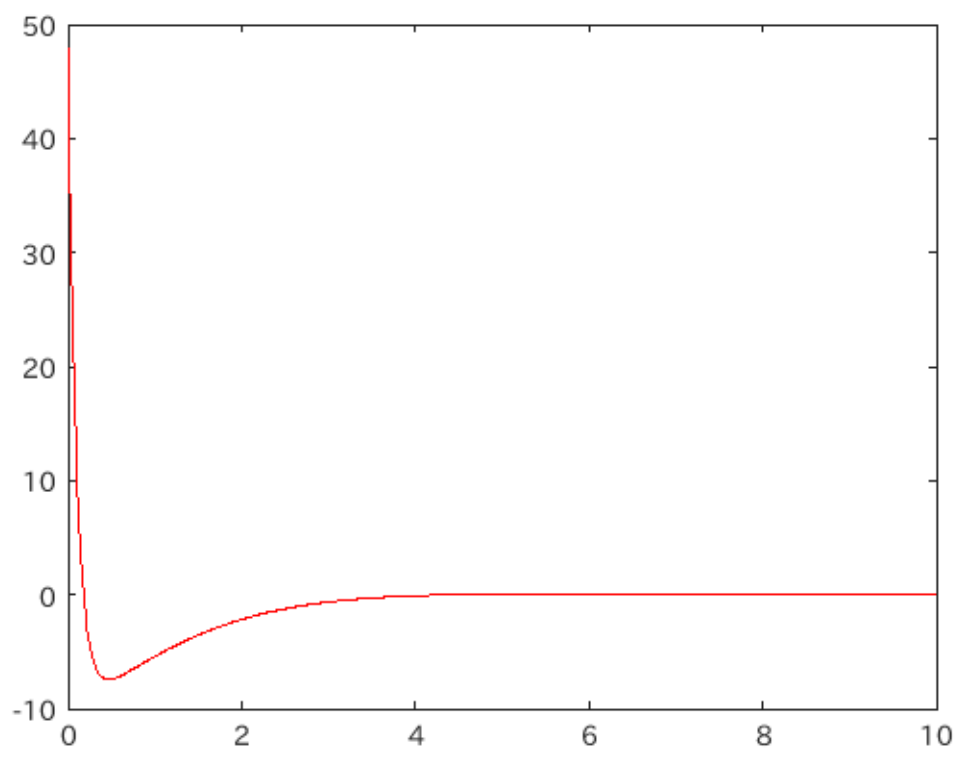
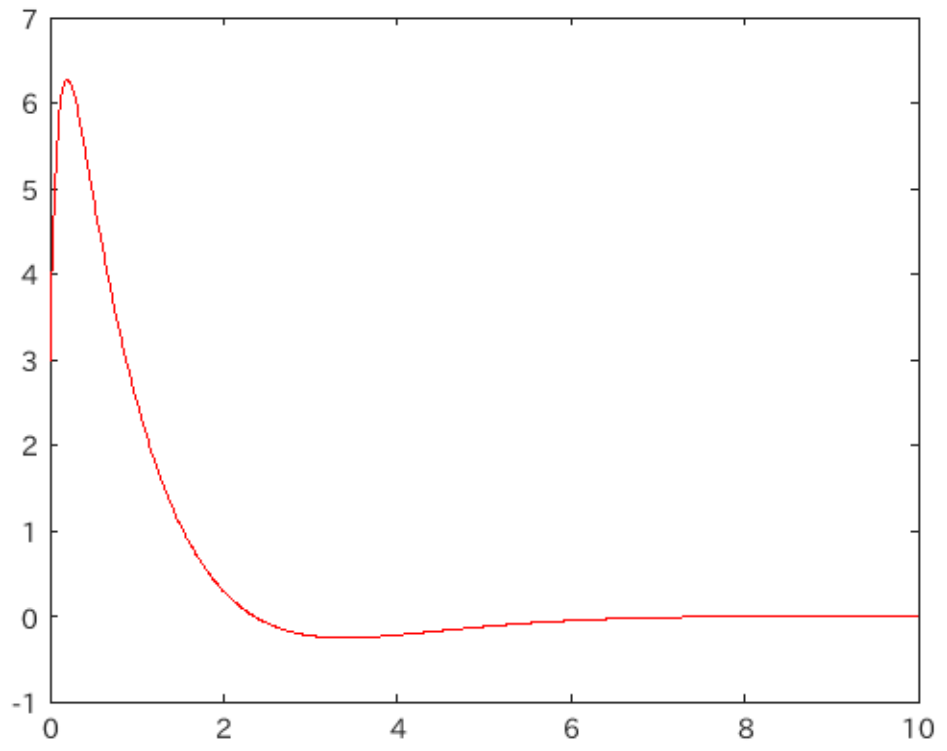
```

```

polesopt =

    -0.8646 + 0.4975i
    -0.8646 - 0.4975i
   -10.0995 + 0.0000i

```



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