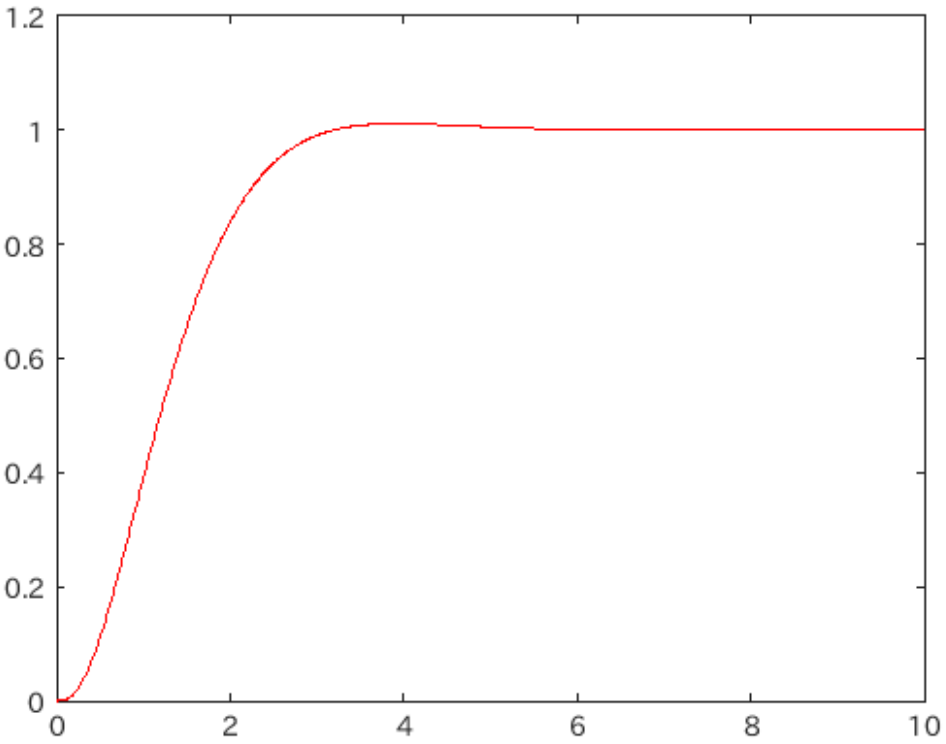
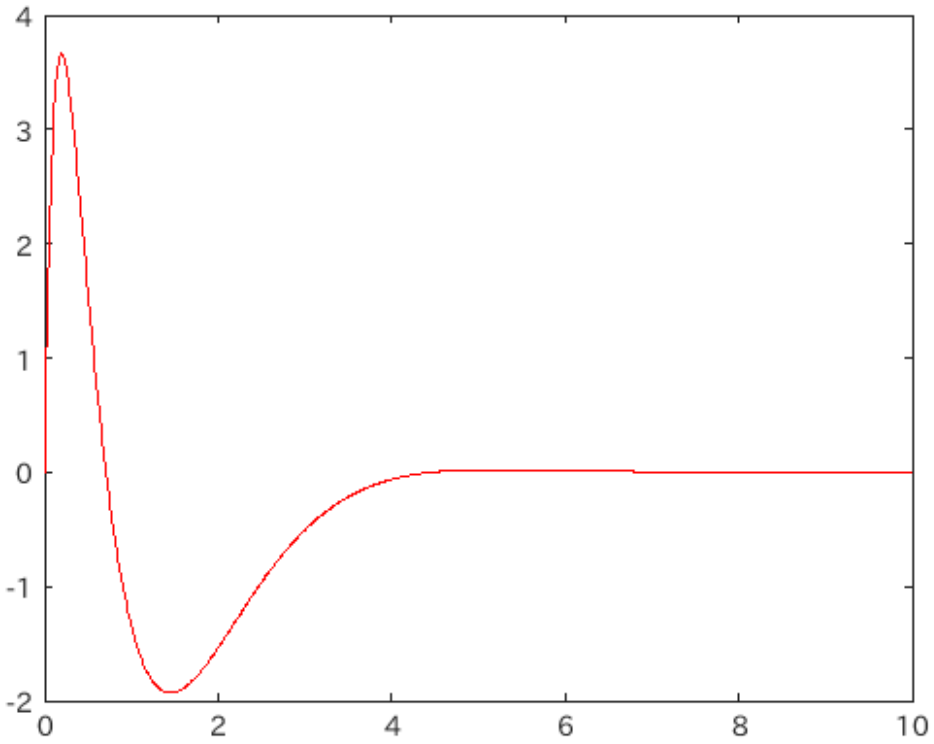
```
function main
global a b c k;
c = [0.3 0 0 0];
X0=[0,0,0,0];


[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(:,3)','r');
hold on

%figure(3)
%plot(t,xf(:,4)','r');
%hold on
%end



function dx = sub(t,x);
    global a b c k;
%u = 1;
r = 1;
y = c(1)*x(1)+c(2)*x(2)+c(3)*x(3);
a = [0 1 0 0;0 0.5 0 0;0 0 0 0];
b = [0;1;0;0];



if abs(x(3))<=r
u = x(3);
elseif x(3)>r
    u = r;
else
    u = -r;
end
anti = u-x(3);
u = x(3);%comment out -> windup

dx = zeros(4,1);
dx(1) = a(1,:)*x+b(1)*u;
dx(2) = a(2,:)*x+b(2)*u;
dx(3) = -10*x(3)+50*(r-y)-80*(c(1)*dx(1)+c(2)*dx(2));%+x(4);%anti-
windup controller input x(4)
dx(4) = -0.3*x(4)+7*anti;%anti windup controller
```


1.2
1
0.8
0.6
0.4
0.2
0
0
2
4
6
8
10


4
3
2
1
0
-1
-2
0
2
4
6
8
10

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