

컴퓨터 예제 9-1

MATLAB Program-----

```
clf

A=[0 1;0 -1]
B=[0;1]
C=[1 0]
D=0

K(1)=100;
K(2)=10;

Acl=A-B*K;
h=ss(Acl,B,C,D);

t = 0:0.001:4;

ref=zeros(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0]);

plot(ts,xs(:,1),'-b',ts,xs(:,2),'--b','LineWidth',3);
axis([0 2 -6 2])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Output')
grid on
```

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컴퓨터 예제 9-2

MATLAB Program-----

```
clf

A=[0 1;-1 0];
B=[0;1];
C=[1 0];
D=0;

K=acker(A,B,[-2 -2])

Acl=A-B*K;
h=ss(Acl,B,C,D);

t = 0:0.001:4;
```

```

ref=zeros(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0]);

subplot(2,1,1)
plot(ts,xs(:,1),'-b',ts,xs(:,2),'--b','LineWidth',3);
axis([0 4 -2 2])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Output')
grid on

subplot(2,1,2)
plot(ts,-K(1)*xs(:,1)-K(2)*xs(:,2),'LineWidth',3);
axis([0 4 -15 5])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Control')
grid on

```

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**컴퓨터** 예제 9-3

**MATLAB Program**-----

```

clf

A=[0 1;-1 -2];
B=[0;1];
C=[1 0];
D=0;

L=acker(A',C',[-2 -2])

h=ss([A [0 0;0 0];L'*C A-L'*C],[B;B],[C 0 0],0);

t = 0:0.001:10;

ref=zeros(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0.5;0;0]);

subplot(2,1,1)
plot(ts,xs(:,1),'-b',ts,xs(:,3),'--b','LineWidth',3);
axis([0 8 0 1.5])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

subplot(2,1,2)
plot(ts,xs(:,2),'-b',ts,xs(:,4),'--b','LineWidth',3);
axis([0 8 -0.5 0.5])

```

```

set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

```

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**컴퓨터** 예제 9-4

**MATLAB Program**-----

```

clf

A=[0 1;0 0];
B=[0;1];
C=[1 0];
D=0;

K=acker(A,B,[-1 -1])
L=acker(A',C',[-2 -2])'

h=ss([A-B*K [0 0;0 0];-B*K+L*C A-L*C],[B;B],[C 0 0],0);

t = 0:0.001:10;

ref=zeros(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0.5;0;0]);

subplot(2,1,1)
plot(ts,xs(:,1),'-b',ts,xs(:,3),'--b','LineWidth',3);
axis([0 8 0 1.5])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

subplot(2,1,2)
plot(ts,xs(:,2),'-b',ts,xs(:,4),'--b','LineWidth',3);
axis([0 8 -0.5 0.5])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

```

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**컴퓨터** 예제 9-5

**MATLAB Program**-----

```

clf

```

```

A=[0 1;0 0];
B=[0;1];
C=[1 0];
D=0;

K=acker(A,B,[-1 -1])
L=acker(A',C',[-2 -2])'

h=ss([A -B*K;L*C A-B*K-L*C],[B;0;0],[C 0 0],0);

t = 0:0.001:10;

ref=zeros(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0.5;0;0]);

subplot(2,1,1)
plot(ts,xs(:,1),'-b',ts,xs(:,3),'--b','LineWidth',3);
axis([0 8 -.5 1.5])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

subplot(2,1,2)
plot(ts,xs(:,2),'-b',ts,xs(:,4),'--b','LineWidth',3);
axis([0 8 -1 1])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('State')
grid on

```

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**컴퓨터** 예제 9-6

**MATLAB Program**-----

```

clf

A=[0 1;0 0];
B=[0;1];
C=[1 0];
D=0;

K=acker(A,B,[-3 -3])
L=acker(A',C',[-12 -12])'

sys(1)=ss([A-B*K-L*C],L,K,0);
sys(2)=sys(1)*ss(A,B,C,D);

h=feedback(sys(2),1);
h=tf(h);

```

```

t = 0:0.001:10;

ref=ones(size(t));
[ys ts xs]=lsim(h,ref,t);

plot(ts,ys(:,1),'-b','LineWidth',3);
axis([0 10 0 2])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Output')
grid on

```

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**컴퓨터** 예제 9-7

**MATLAB Program**

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```

clf

A=[0 1;0 0];
B=[0;1];
C=[1 0];
D=0;

K=acker(A,B,[-3 -3])
L=acker(A',C',[-12 -12])'

h=9*ss([A -B*K;L*C A-B*K-L*C],[B;B],[C 0 0],0);
h=tf(h);

t = 0:0.001:10;

ref=ones(size(t));
[ys ts xs]=lsim(h,ref,t,[1;0.5;0;0]);

plot(ts,ys(:,1),'-b','LineWidth',3);
axis([0 10 0 2])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Output')
grid on

```

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**컴퓨터** 예제 9-8

**MATLAB Program**

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```

clf

```

```
A=[0 1;0 -1]
B=[0;1]
C=[1 0]
D=0

Abar=[A [0;0] ; -C 0]
Bbar=[B;0]

K=acker(Abar,Bbar,[-8 -8 -8])
Acl=Abar-Bbar*K;
h=ss(Acl,[0;0;1],[C 0],D);

t = 0:0.001:4;

ref=ones(size(t));
[ys ts xs]=lsim(h,ref,t,[0;0;0]);

plot(ts,ys(:,1),'-b',ts,xs(:,3),'--b','LineWidth',3);
axis([0 2 0 2])
set(gca,'GridLineStyle','-','FontName','times','FontSize',18)
xlabel('Time(sec)');
ylabel('Output')
grid on
```

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