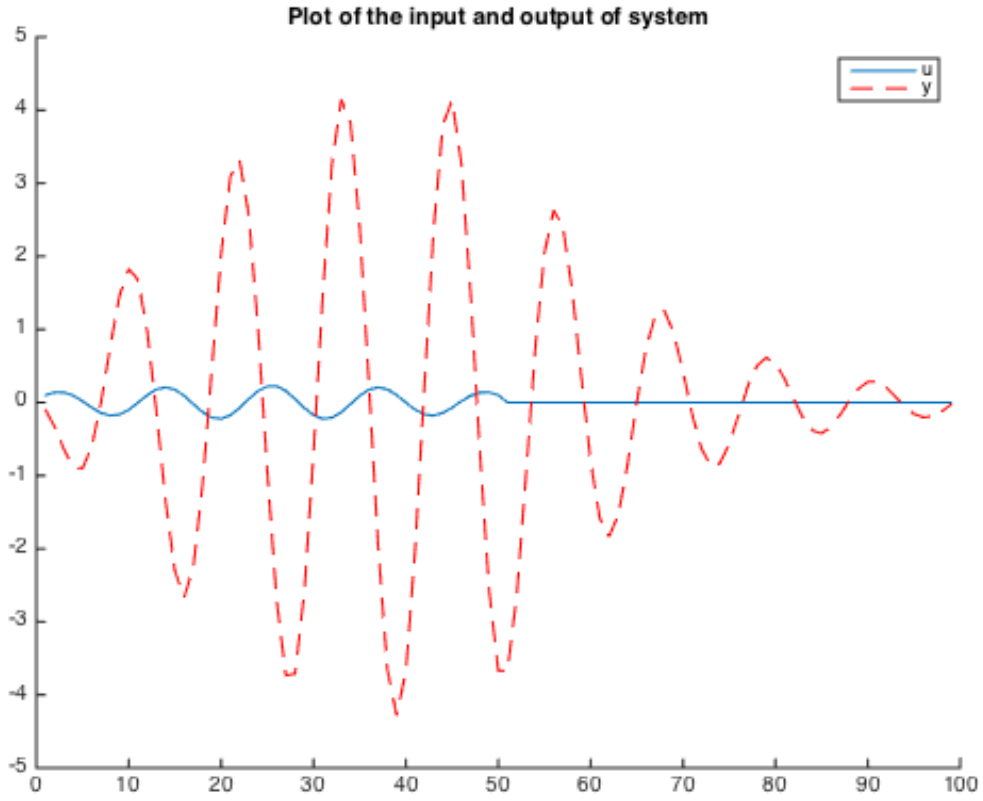
Contents

Part A

```
clear; close all;

A = [0.9 0.5;-0.5 0.7];
B= [1;-1];
C = [1 2];

% Generate G
for i = 1:99
    for j = 1:i
          G(i,j) = C*A^(i-1-(j-1))*B;
    end
end

G(51:end,51:end) = 0;

[V,D] = eig(G'*G);
utemp = [V(1:50,99); zeros(49,1)]; %maximum eigenvalue is 342.3307 in column 100
y = G*utemp;
sum2 = y'*y;
disp(['The norm squared of y is : ' num2str(sum2)]);
figure;hold;
plot(utemp');
plot(y,'--r');
legend('u', 'y');
title('Plot of the input and output of system');
```

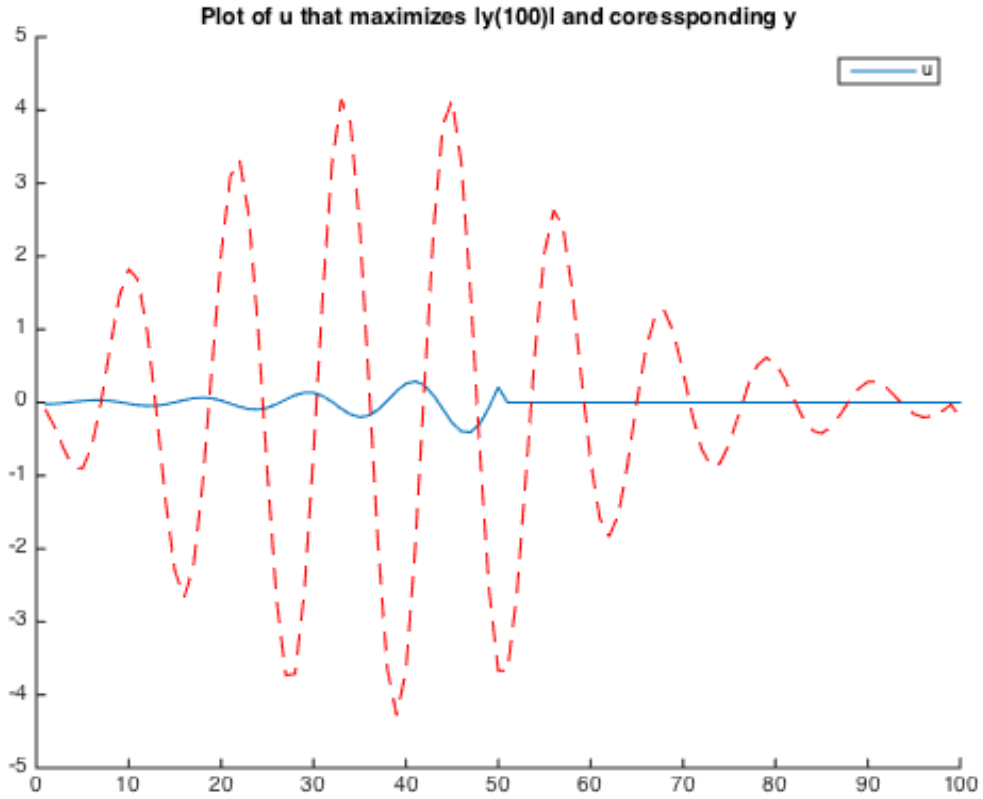
```
The norm squared of y is : 342.327
Current plot held
```



Part B

```
for i = 100
    for j = 1:i
          G100(j) = C*A^(i-1-(j-1))*B;
    end
end
G100(51:100) = 0;
[V,D] = eig(G100'*G100);
u100 = [V(1:50,100); zeros(50,1)];
y100 = G100*u100;
figure;hold;
plot(u100);
plot([y;y100], '--r');
legend('u');
title('Plot of u that maximizes |y(100)| and coressponding y');
max = abs(y100);
disp(['The maximum value of |y(100)| is : ' num2str(max)]);
```

```
Current plot held
The maximum value of |y(100)| is : 0.20705
```



Published with MATLAB® R2014b