THE UNIVERSITY OF TEXAS AT ARLINGTON, TEXAS
DEPARTMENT OF ELECTRICAL ENGINEERING

EE 5329

Distributed Decision and Control

HW # 4
ASSIGNMENT

by

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Presented to

Dr. Frank Lewis

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EE 5329 Distributed Decision and Control

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Homework Pledge of Honor

On all homeworks in this class - YOU MUST WORK ALONE.

Any cheating or collusion will be severely punished.

It is very easy to compare your software code and determine if you worked together

It does not matter if you change the variable names.

Please sign this form and include it as the first page of all of your submitted homeworks.

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…..........

Typed Name: <u>Soutrik Maiti</u>

Pledge of honor:

"On my honor I have neither given nor received aid on this homework."

e-Signature: <u>Soutrik Maiti</u>

Problem 1:

MATLAB Code:

```matlab
%A matrix for third problem
a3= [0 0.5 0.5 0.5 0.5 0.5;
   0.5 0 0 0 0 0;
   0.5 0 0 0 0 0;
   0.5 0 0 0 0 0;
   0.5 0 0 0 0 0;
   0.5 0 0 0 0 0];

%A matrix for seventh problem
a7= [0 0.5 0 0 0 0;
   0.5 0 0.5 0 0 0;
   0 0.5 0 0.5 0 0;
   0 0 0.5 0 0.5 0;
   0 0 0 0.5 0 0.5;
   0 0 0 0 0.5 0];


%In degree matrix for third problem
d3= diag([sum(a3(1,:));sum(a3(2,:));sum(a3(3,:));sum(a3(4,:));sum(a3(5,:));sum(a3(6,:))]);
%In degree matrix for seventh problem
d7= diag([sum(a7(1,:));sum(a7(2,:));sum(a7(3,:));sum(a7(4,:));sum(a7(5,:));sum(a7(6,:))]);

%Graph aplacian matrix for third problem
l3= d3-a3;
%Graph aplacian matrix for seventh problem
l7= d7-a7;

%Random initial values for third problem
x3= (2)*rand(1,6)-1;
%Random initial values for seventh problem
x7= (2)*rand(1,6)-1;

for k=1:80
   %for third problem
   x3(k+1,:) = (eye(6)-(inv(eye(6)+d3))*l3)* x3(k,:)';
   %for seventh problem
   x7(k+1,:) = (eye(6)-(inv(eye(6)+d7))*l7)* x7(k,:)';
end

%plot for third problem
figure
plot(0:80,x3)
legend('1','2','3','4','5','6')
title('State vs. Time')
xlabel('Time');
ylabel('State');

%plot for seventh problem
figure
```
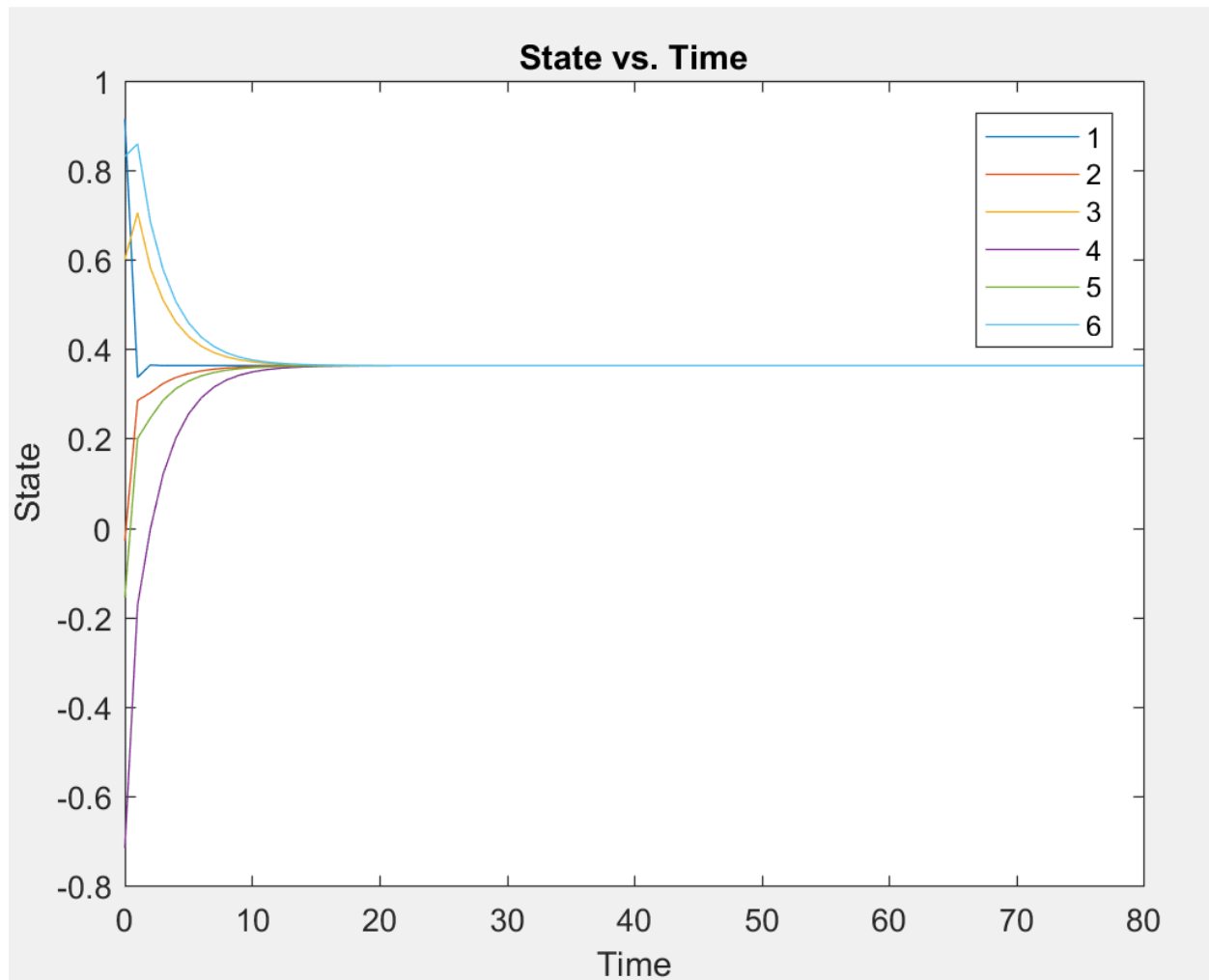
```
plot(0:80,x7)
legend('1','2','3','4','5','6')
title('State vs. Time')
xlabel('Time');
ylabel('State');
```

Results:
For graph 3

For graph 7