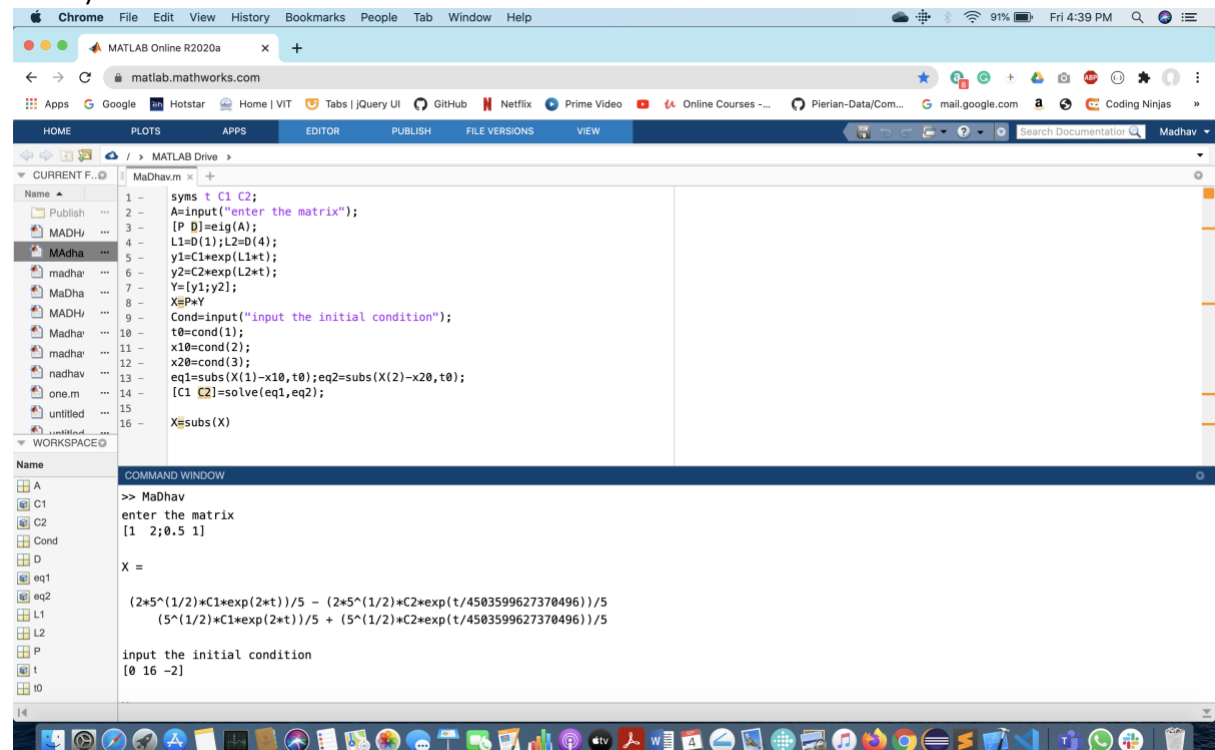


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LAB ASSIGNMENT

Ans 1)



The screenshot shows the MATLAB Online R2020a interface. The editor displays a script with the following code:

```
1 syms t C1 C2;  
2 A=input("enter the matrix");  
3 [P D]=eig(A);  
4 L1=D(1);L2=D(4);  
5 y1=C1*exp(L1*t);  
6 y2=C2*exp(L2*t);  
7 Y=[y1;y2];  
8 X=P*Y;  
9 Cond=input("input the initial condition");  
10 t0=cond(1);  
11 x10=cond(2);  
12 x20=cond(3);  
13 eq1=subs(X(1)-x10,t0);eq2=subs(X(2)-x20,t0);  
14 [C1 C2]=solve(eq1,eq2);  
15  
16 X=subs(X)
```

The command window shows the execution results:

```
>> MaDhav  
enter the matrix  
[1 2;0.5 1]  
  
X =  
  
(2*5^(1/2)*C1*exp(2*t))/5 - (2*5^(1/2)*C2*exp(t/4503599627370496))/5  
(5^(1/2)*C1*exp(2*t))/5 + (5^(1/2)*C2*exp(t/4503599627370496))/5  
  
input the initial condition  
[0 16 -2]  
  
X =  
  
(3*exp(2*t)*exp(-2))/2 - (exp(t/4503599627370496)*exp(-1/4503599627370496))/2  
(exp(t/4503599627370496)*exp(-1/4503599627370496))/4 + (3*exp(2*t)*exp(-2))/4  
  
>>
```

Ans 2)

```

1 - clc
2 - A=input("enter the matrix");
3 - [P D]=eig(A);
4 - Sol1=dsolve('D2y=',num2str(D(1)),'*y');
5 - Sol2=dsolve('D2y=',num2str(D(4)),'*y');
6 - X=P*[Sol1;Sol2];
7 - disp('x1=');disp(X(1))
8 - disp('x2=');disp(X(2))

```

COMMAND WINDOW

```

enter the matrix
[2 1;9 2]
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
In MadHav (line 4)
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
In MadHav (line 5)
x1=
(10^(1/2)*(C1*exp(5^(1/2)*t) + C2*exp(-5^(1/2)*t)))/10 - (10^(1/2)*(C1*cos(t) - C2*sin(t)))/10
x2=
(3*10^(1/2)*(C1*cos(t) - C2*sin(t)))/10 + (3*10^(1/2)*(C1*exp(5^(1/2)*t) + C2*exp(-5^(1/2)*t)))/10
>>

```

Ans3)

```

1 - syms t C1 C2;
2 - A=input("enter the matrix");
3 - [P D]=eig(A);
4 - L1=D(1);L2=D(4);
5 - y1=C1*exp(L1*t);
6 - y2=C2*exp(L2*t);
7 - Y=[y1;y2];
8 - X=P*Y;
9 - Conds=input("input the initial condition");

```

COMMAND WINDOW

```

enter the matrix
[3 -2;-2 2]
input the initial condition
[0 1 -1]
X =
(exp(-t)*exp(1))/3 + (2*exp(2*t)*exp(-2))/3
(2*exp(-t)*exp(1))/3 + (exp(2*t)*exp(-2))/3
>>

```

b)

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MATLAB Online R2020a

matlab.mathworks.com

HOME PLOTS APPS EDITOR PUBLISH FILE VERSIONS VIEW

MATLAB Drive

CURRENT F... MaDhav.m x

```

1 - clc
2 - syms t C1 C2 C3;
3 - A=input("enter the matrix");
4 - [P D]=eig(A);
5 - L1=D(1);L2=D(5);L3=D(9);
6 - y1=C1*exp(L1*t);
7 - y2=C2*exp(L2*t);
8 - y3=C3*exp(L3*t);
9 - Y=[y1;y2;y3];
10 - X=P*Y

```

COMMAND WINDOW

enter the matrix  
[0 -1 1;4 -1 -4;-3 -1 4]

X =

$$\begin{pmatrix} (6^{1/2}*C3*exp(-t))/6 - (6^{1/2}*C1*exp(3*t))/6 + (2^{1/2}*C2*exp(t))/2 \\ (6^{1/2}*C1*exp(3*t))/6 - (7165183131591449+C2*exp(t))/10141204801825835211973625643008 + (2^{1/2}*3^{1/2}*C3*exp(-t))/3 \\ (6^{1/2}*C3*exp(-t))/6 + (2^{1/2}*C2*exp(t))/2 - (2^{1/2}*3^{1/2}*C1*exp(3*t))/3 \end{pmatrix}$$

WORKSPACE

Name

A  
C1  
C2  
C3  
Cond  
D  
eq1  
eq2  
L1  
L2  
L3  
P

ANS 4)

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MATLAB Online R2020a

matlab.mathworks.com

HOME PLOTS APPS EDITOR PUBLISH FILE VERSIONS VIEW

MATLAB Drive

CURRENT F... MadHav.m x

```

1 - clc
2 - A=input("enter the matrix");
3 - [P D]=eig(A);
4 - Sol1=dsolve('D2y=',num2str(D(1)),'y');
5 - Sol2=dsolve('D2y=',num2str(D(4)),'y');
6 - X=P*[Sol1;Sol2];
7 - disp('x1=');disp(X(1))
8 - disp('x2=');disp(X(2))

```

COMMAND WINDOW

enter the matrix  
[-5 2;2 -2]

Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.  
> In dsolve (line 126)  
In MadHav (line 4)  
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.  
> In dsolve (line 126)  
In MadHav (line 5)

x1=

$$-(5^{1/2}*(C1*cos(t) - C2*sin(t)))/5 - (2*5^{1/2}*(C1*cos(6^{1/2}*t) - C2*sin(6^{1/2}*t)))/5$$

x2=

$$(5^{1/2}*(C1*cos(6^{1/2}*t) - C2*sin(6^{1/2}*t)))/5 - (2*5^{1/2}*(C1*cos(t) - C2*sin(t)))/5$$

WORKSPACE

Name

A  
C1  
C2  
C3  
Cond  
D  
eq1  
eq2  
L1  
L2  
L3  
P

B)

ANS 5)

```

1 - clc
2 - A=input("enter the matrix");
3 - [P D]=eig(A);
4 - Sol1=dsolve('D2y=',num2str(D(1)),'y');
5 - Sol2=dsolve('D2y=',num2str(D(4)),'y');
6 - X=P*[Sol1;Sol2];
7 - disp('x1=');disp(X(1))
8 - disp('x2=');disp(X(2))

```

COMMAND WINDOW

```

enter the matrix
[-2 1;1 -2]
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
   In MadHav (line 4)
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
   In MadHav (line 5)
x1=
(2^(1/2)*(C1*cos(t) - C2*sin(t)))/2 + (2^(1/2)*(C1*cos(3^(1/2)*t) - C2*sin(3^(1/2)*t)))/2
x2=
(2^(1/2)*(C1*cos(t) - C2*sin(t)))/2 - (2^(1/2)*(C1*cos(3^(1/2)*t) - C2*sin(3^(1/2)*t)))/2
>>

```

ANS 6)

```

1 - clc
2 - A=input("enter the matrix");
3 - [P D]=eig(A);
4 - Sol1=dsolve('D2y=',num2str(D(1)),'y');
5 - Sol2=dsolve('D2y=',num2str(D(4)),'y');
6 - X=P*[Sol1;Sol2];
7 - disp('x1=');disp(X(1))
8 - disp('x2=');disp(X(2))

```

COMMAND WINDOW

```

enter the matrix
[-4 3;3 -4]
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
   In MadHav (line 4)
Warning: Support of character vectors and strings will be removed in a future release. Use sym objects to define differential equations instead.
> In dsolve (line 126)
   In MadHav (line 5)
x1=
(2^(1/2)*(C1*cos(t) - C2*sin(t)))/2 + (2^(1/2)*(C1*cos(7^(1/2)*t) - C2*sin(7^(1/2)*t)))/2
x2=
(2^(1/2)*(C1*cos(t) - C2*sin(t)))/2 - (2^(1/2)*(C1*cos(7^(1/2)*t) - C2*sin(7^(1/2)*t)))/2
>>

```

The MATLAB Editor shows a script named 'MaDhav.m' with the following code:

```

1 clc
2 syms t C1 C2 C3;
3 A=input("enter the matrix");
4 [P D]=eig(A);
5 L1=D(1);L2=D(5);L3=D(9);
6 y1=C1*exp(L1*t);
7 y2=C2*exp(L2*t);
8 y3=C3*exp(L3*t);
9 Y=[y1;y2;y3];
10 X=P*Y
11 % Cond=input("input the initial condition");
12 % t0=cond(1);
13 % x10=cond(2);
14 % x20=cond(3);
15 % eq1=subs(X(1)-x10,t0);eq2=subs(X(2)-x20,t0);
16 % [C1 C2]=solve(eq1,eq2);
17 % X=subs(X)
18

```

The Command Window shows the execution results:

```

enter the matrix
[0 1 0; 0 0 1; 2 1 -2]

X =

(3^(1/2)*C2*exp(-t))/3 + (21^(1/2)*C1*exp(-2*t))/21 - (3^(1/2)*C3*exp(t))/3
- (3^(1/2)*C2*exp(-t))/3 - (2*21^(1/2)*C1*exp(-2*t))/21 - (3^(1/2)*C3*exp(t))/3
(3^(1/2)*C2*exp(-t))/3 + (4*21^(1/2)*C1*exp(-2*t))/21 - (3^(1/2)*C3*exp(t))/3

>> |

```

ANS 7)

The MATLAB Editor shows a script named 'MaDhav.m' with the following code:

```

1 clc
2 syms t C1 C2 C3;
3 A=input("enter the matrix");
4 [P D]=eig(A);
5 L1=D(1);L2=D(4);
6 y1=C1*exp(L1*t);
7 y2=C2*exp(L2*t);
8 % y3=C3*exp(L3*t);
9 Y=[y1;y2];
10 X=P*Y
11 Cond=input("input the initial condition");
12 t0=cond(1);
13 x10=cond(2);
14 x20=cond(3);
15 % eq1=subs(X(1)-x10,t0);eq2=subs(X(2)-x20,t0);
16 % [C1 C2]=solve(eq1,eq2);
17 % X=subs(X)
18

```

The Command Window shows the execution results:

```

enter the matrix
[-0.02 0.02; 0.02 -0.02]

X =

(2^(1/2)*C2)/2 + (2^(1/2)*C1*exp(-t/25))/2
(2^(1/2)*C2)/2 - (2^(1/2)*C1*exp(-t/25))/2

input the initial condition
[0 0 150]

X =

1
1

>> |

```