EXPERIMENT NO 7

QUESTION NUMBER 1

NUMERICAL DIFFERENTIATION AND INTEGRATION

<u>OUTPUT</u>

FIRST DERIVATIVE OF sin(t) USING gradient

cos(t)

SECOND DERIVATIVE OF sin(t) USING gradient

-sin(t)

FIRST DERIVATIVE OF cos(t) USING gradient

-sin(t)

SECOND DERIVATIVE OF cos(t) USING gradient

-cos(t)

FIRST DERIVATIVE OF sinh(t) USING gradient

cosh(t)

SECOND DERIVATIVE OF sinh(t) USING gradient sinh(t)

FIRST DERIVATIVE OF cosh(t) USING gradient

sinh(t)

SECOND DERIVATIVE OF cosh(t) USING gradient

cosh(t)

FIRST DERIVATIVE OF sin(t) USING diff

cos(t)

SECOND DERIVATIVE OF sin(t) USING diff

-sin(t)

FIRST DERIVATIVE OF cos(t) USING diff

-sin(t)

SECOND DERIVATIVE OF cos(t) USING diff

-cos(t)

FIRST DERIVATIVE OF sinh(t) USING diff

cosh(t)

SECOND DERIVATIVE OF sinh(t) USING diff

sinh(t)

FIRST DERIVATIVE OF cosh(t) USING diff

sinh(t)

SECOND DERIVATIVE OF cosh(t) USING diff

cosh(t)

Figure1

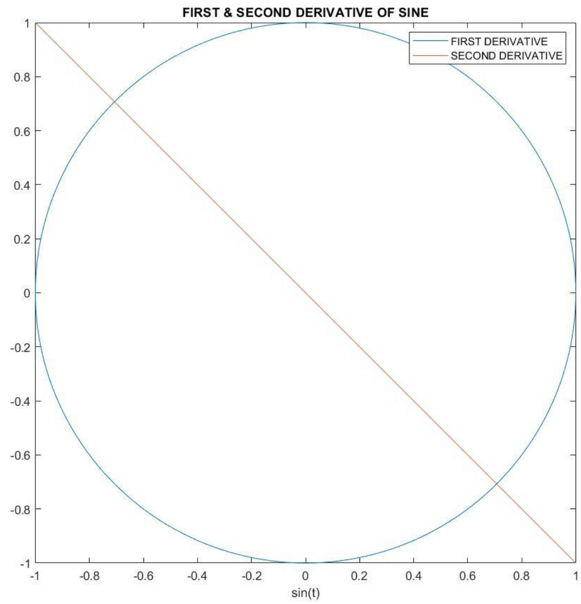
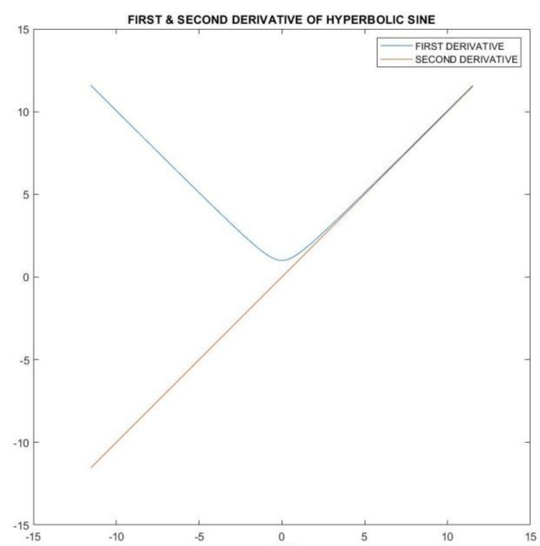


Figure2



EXPERIMENT NO 7

QUESTION NUMBER 2

NUMERICAL DIFFERENTIATION AND INTEGRATION

<u>OUTPUT</u>

INTEGRATING f(t) = t FROM 0 T0 2

INTEGRATION USING integral FUNCTION   2.0000

INTEGRATION USING TRAPEZOIDAL NUMERICAL INTEGRATION   2

INTEGRATING f(t) = 4t.^2+3 FROM -4 T0 0

INTEGRATION USING integral FUNCTION   97.3333

INTEGRATION USING TRAPEZOIDAL NUMERICAL INTEGRATION   100

INTEGRATING f(t) = t.^2 FROM -2 T0 2

INTEGRATION USING integral FUNCTION   5.3333

INTEGRATION USING TRAPEZOIDAL NUMERICAL INTEGRATION   6

INTEGRATING f(x) =1/sqrt(2*pi)*exp(-x.^2/2) FROM 0 T0 INFINITY

INTEGRATION USING integral FUNCTION 0.5000

INTEGRATION USING TRAPEZOIDAL NUMERICAL INTEGRATION
0.5000

EXPERIMENT NO 7

QUESTION NUMBER 3

NUMERICAL DIFFERENTIATION AND INTEGRATION

<u>OUTPUT</u>

DOUBLE INTEGRATION USING integral2 FUNCTION

f(x,y) = xy, 0 < x < 2, 0 < y < 3

    9.0000

TRIPLE INTEGRATION USING integral3 FUNCTION

f(x,y,z) = x.^2+y.^2+z.^2, -1<x<1, -1<y<1, -1<z<1

    8.0000

EXPERIMENT NO 7

QUESTION NUMBER 4

NUMERICAL DIFFERENTIATION AND INTEGRATION

OUTPUT

INTEGRATING A POLYNOMIAL USING polyint FUNCTION

INTEGRAL OF P(x) = 3x^4-4x^2+10x-25 WRT x FROM _-1 to 3

49.0667

DIFFRENTIATING A POLYNOMIAL USING polyder FUNCTION

DIFFERENTIAL OF P(x)= 3x^4_4x^2+10x-25

12 0 -8 10

DIFFERENTIAL,OF P(x) = 3x^5-2x^3+x+5

15 0 -6 0 1

DIFFERENTIAL OF P(x) =(x^4-2x^3+11)*(x^2-10X+15)

-6 60 -140 90 22 -110

EXPERIMENT NO 8

QUESTION NUMBER 1

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

OUTPUT

Equation 1:

Dy = y*x

Solution without initial condition

C1*exp(x^2/2)

Solution with initial condition, y(0) = 1

exp(x^2/2)

Equation 2:

Dx + 2*x = 0

Solution with initial condition, x(0) = 1

exp(-2*t)

Figure1

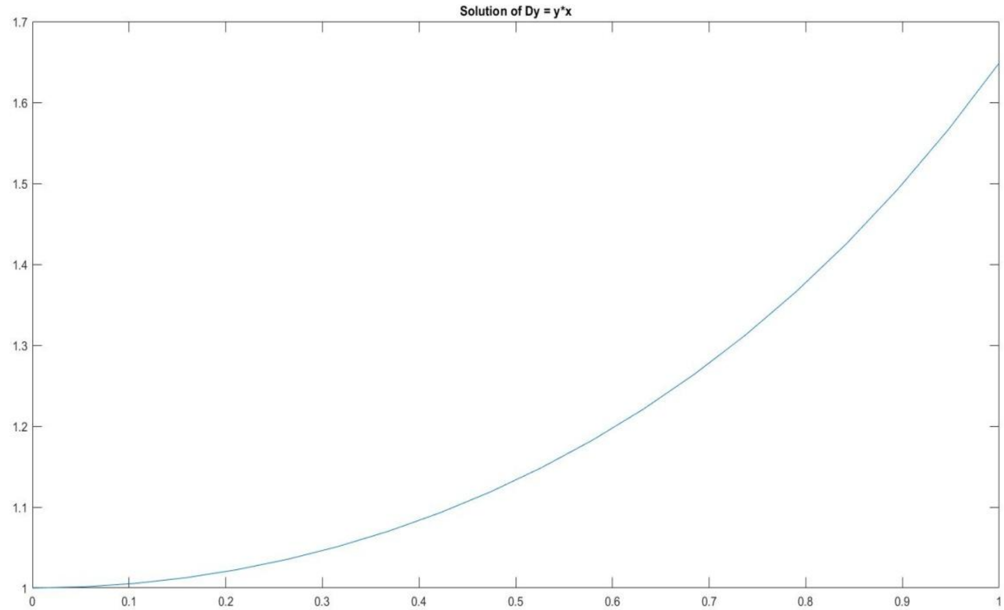
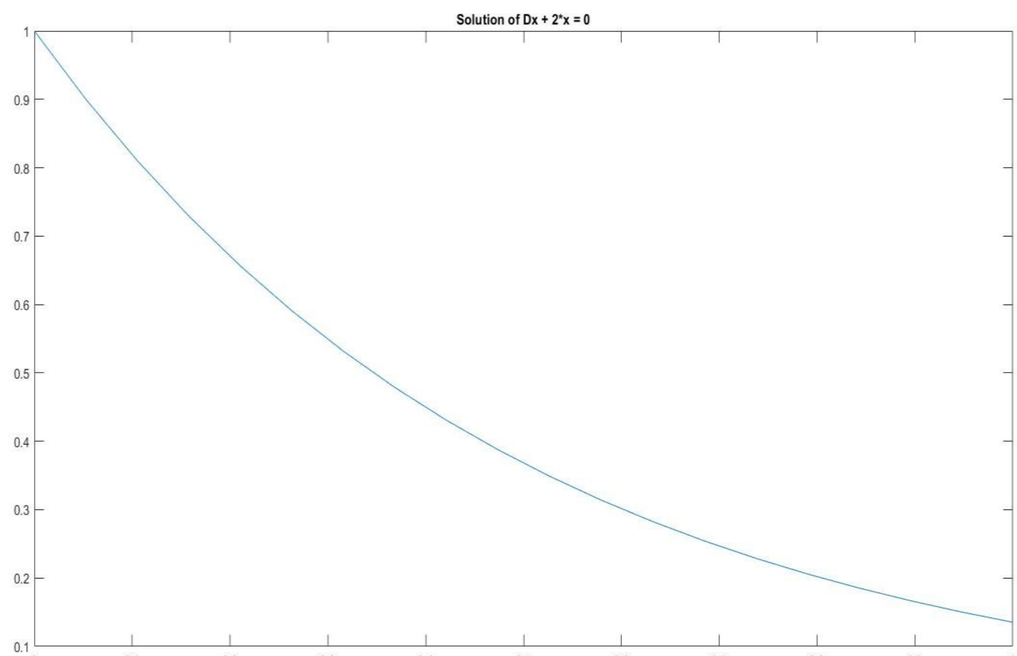


Figure2



EXPERIMENT NO 8

QUESTION NUMBER 2

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

OUTPUT

Equation 1:

D2y + 8*Dy + 2*y = cos(x)

Solution with initial condition, y(0)=0,y'(0)=1

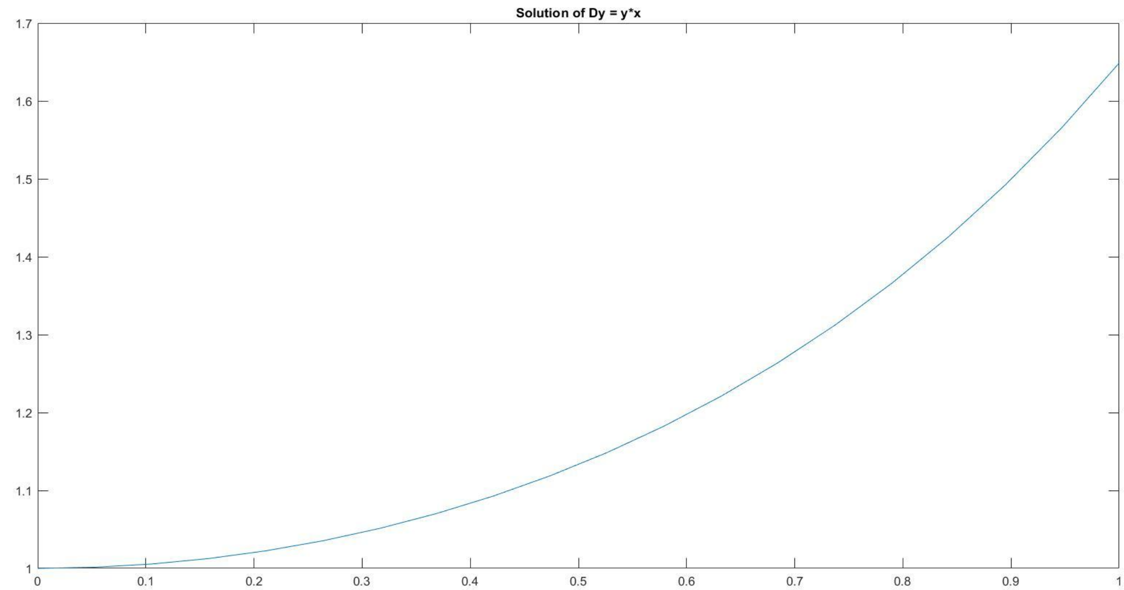
(14^(1/2)*exp(x*(14^(1/2) - 4))*(7*14^(1/2) - 27))/(28*(8*14^(1/2) - 31)) - (14^(1/2)*exp(4*x + 14^(1/2)*x)*exp(-x*(14^(1/2) + 4))*(sin(x) +cos(x)*(14^(1/2) + 4)))/(28*((14^(1/2) + 4)^2 + 1)) + (14^(1/2)*exp(4*x - 14^(1/2)*x)*exp(x*(14^(1/2) - 4))*(sin(x) - cos(x)*(14^(1/2) - 4)))/(28*((14^(1/2) - 4)^2 + 1)) + (14^(1/2)*exp(-x*(14^(1/2) + 4))*(393*14^(1/2) - 1531))/(28*(8*14^(1/2) - 31)^2*(8*14^(1/2) + 31))

Equation 2:

D2x +2*Dx +2*x = exp(-t)

Solution without initial condition

exp(-t) + C6*exp(-t)*cos(t) - C7*exp(-t)*sin(t)


Solution of Dy = y*x
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

EXPERIMENT NO 8

QUESTION NUMBER 3

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

OUTPUT

INPUT SIGNAL, V =

5

EQUATION FOR CURRENT IS

I(t)/3 + diff(I(t), t) == 0

symbolic function inputs: t

WITH INITIAL CONDITION

I(0) == 5/3

TRANSIENT CURRENT FOR RC CIRCUIT FOR 5V DC INPUT

(5*exp(-t/3))/3

INPUT SIGNAL, V = 5*exp(-t)

EQUATION FOR CURRENT IS

I(t)/3 + diff(I(t), t) == -(5*exp(-t))/3

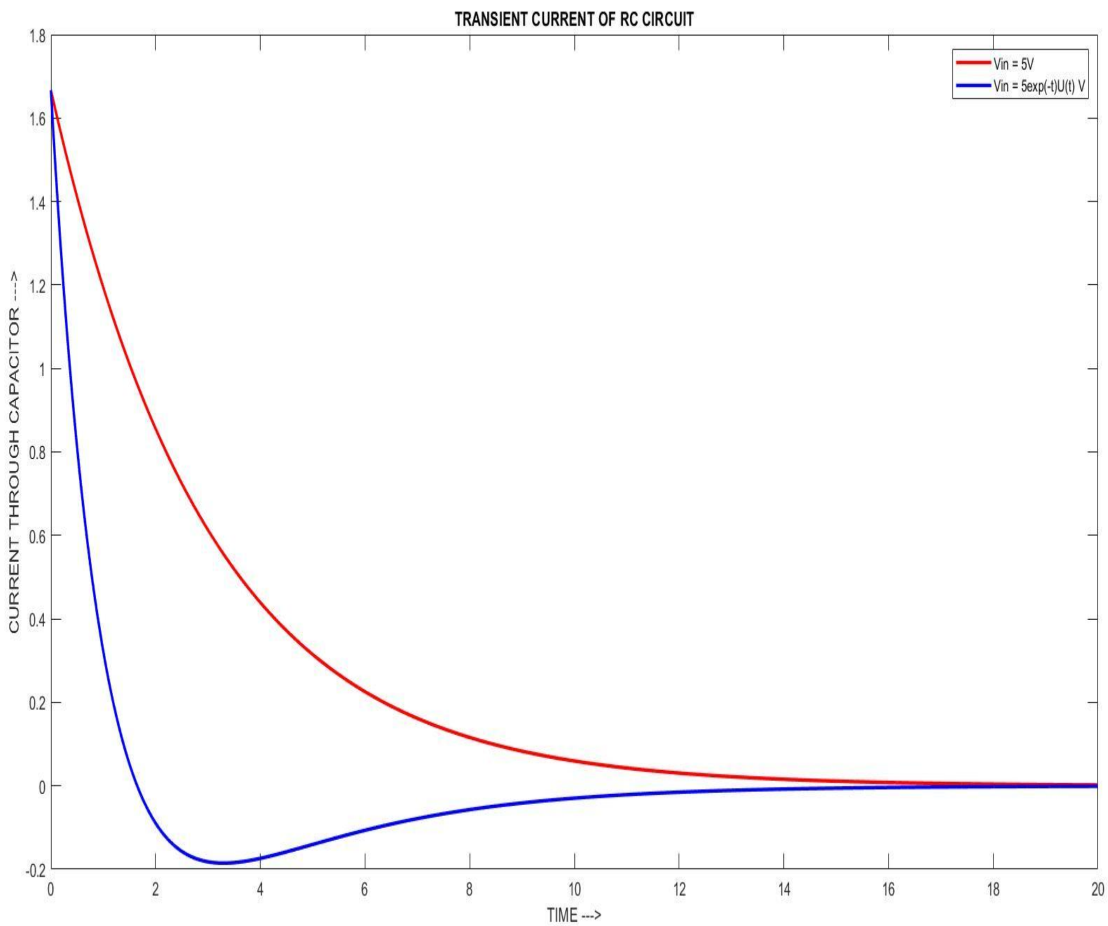
symbolic function inputs: t

WITH INITIAL CONDITION

I(0) == 5/3

TRANSIENT CURRENT FOR RC CIRCUIT FOR INPUT 5exp(-t)U(t)

(5*exp(-t/3)*exp(-(2*t)/3))/2 - (5*exp(-t/3))/6



EXPERIMENT NO 8

QUESTION NUMBER 4

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

OUTPUT

R =

1

L =

1.0000e-03

C =

1.0000e-06

INPUT SIGNAL,

V =

5

EQUATION FOR CURRENT IS

1000000000*I(t) + 1000*diff(I(t), t) + diff(I(t), t, t) == 0

symbolic function inputs: t

WITH INITIAL CONDITION

[I(0) == 0, subs(diff(I(t), t), t, 0) == 5]

TRANSIENT CURRENT FOR RLC CIRCUIT FOR 5V DC INPUT

(3999^(1/2)*exp(-500*t)*sin(500*3999^(1/2)*t))/399900

INPUT SIGNAL, V = 5*exp(-t)

EQUATION FOR CURRENT IS

1000000000*I(t) + 1000*diff(I(t), t) + diff(I(t), t, t) == -5000*exp(-t)

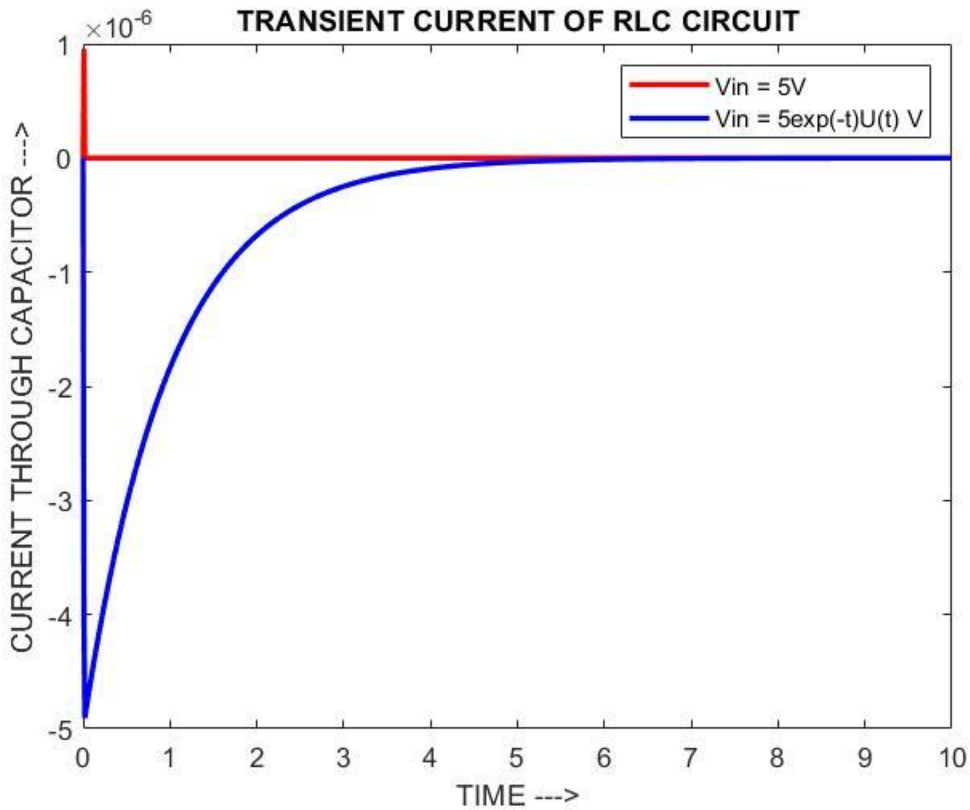
symbolic function inputs: t

WITH INITIAL CONDITION

[I(0) == 0, subs(diff(I(t), t), t, 0) == 5]

TRANSIENT CURRENT FOR RLC CIRCUIT FOR INPUT 5exp(-t)U(t)

(5000*exp(-500*t)*cos(500*3999^(1/2)*t))/999999001 + (1000498001*3999^(1/2)*exp(-500*t)*sin(500*3999^(1/2)*t))/399899600499900 + (10*3999^(1/2)*exp(-t)*cos(500*3999^(1/2)*t)*(499*sin(500*3999^(1/2)*t) - 500*3999^(1/2)*cos(500*3999^(1/2)*t)))/3998996004999 - (10*3999^(1/2)*exp(-t)*sin(500*3999^(1/2)*t)*(499*cos(500*3999^(1/2)*t) + 500*3999^(1/2)*sin(500*3999^(1/2)*t)))/3998996004999



TRANSIENT CURRENT OF RLC CIRCUIT
×10-6
1
0
-1
-2
-3
-4
-5
0
1
2
3
4
5
6
7
8
9
10
Vin = 5V
Vin = 5exp(-t)U(t) V
CURRENT THROUGH CAPACITOR --->
TIME --->

EXPERIMENT NO 8

QUESTION NUMBER 5

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

OUTPUT

Equation 1:

Dx=x+2*y-z

Equation 2:

Dy=x+z

Equation 3:

Dz=4*x-4*y+5*z

Solution with initial condition, x(0)=1,y(0)=2,z(0)=3

x =

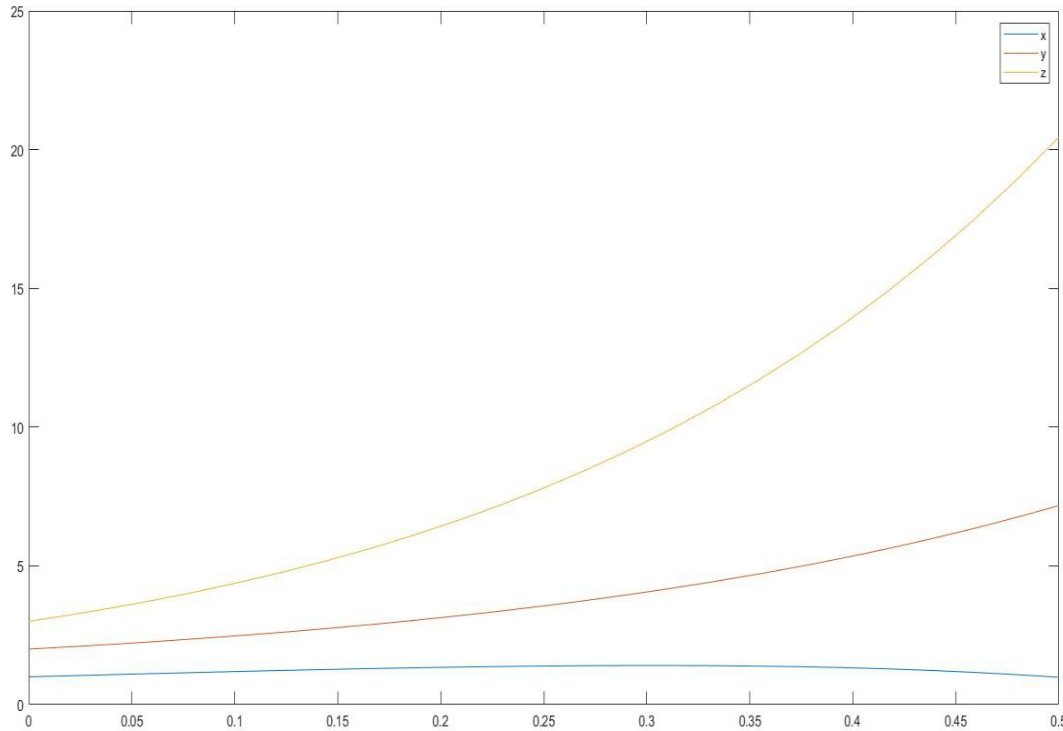
6*exp(2*t) - (5*exp(3*t))/2 - (5*exp(t))/2

y =

(5*exp(3*t))/2 - 3*exp(2*t) + (5*exp(t))/2

z =

10*exp(3*t) - 12*exp(2*t) + 5*exp(t)


25
20
15
10
5
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
x
y
z