

$$(i) x_{sol}(t) = \cos(2^{\wedge} \omega/2)^{\wedge} t) / 2 - \exp(-2^{\wedge} t) / 3 - \exp(-t) / 3 - (5^{\wedge} \sin(2^{\wedge} \omega/2)^{\wedge} t)$$

$$y_{sol}(t) = (2^{\wedge} \exp(-t) / 3 - \exp(-2^{\wedge} t) / 3 + (2^{\wedge} \omega/2)^{\wedge} \sin(2^{\wedge} \omega/2)^{\wedge} t) / 2 + 2^{\wedge} (\omega/2)^{\wedge} \cos(2^{\wedge} \omega/2)^{\wedge} t)$$

ii) visualising the solution on graph separately continue with

```
fplot(x_sol)
fplot(y_sol)
grid on
legend('x_sol', 'location', 'best')
legend('y_sol', 'location', 'best')
```

iii) visualising the solution on graph together continue with

```
fplot(x_sol)
hold on
fplot(y_sol)
grid on
legend('x_sol', 'y_sol', 'location', 'best')
```

Question 4c)

i) command window;

```
clc;
clear;
close all;
syms t, s, w, x, k, q;
x = k * exp(-a * t) * sin(s * w * t) * cos(s * w * t);
f = laplace(x, t, s);
simplify(f);
pretty(ans)
```

ii) command window;

```
clc;
clear;
close all;
```

Name: Obi-Ahete Peace

Dept. Elect/Elect

matno. 171890462

### Question (4a)

Command window:

clc ;

clear ;

close all ;

syms n(t)

$$\text{eqn} = \text{diff}(n, t, 2) - \text{diff}(n, t) - 12 * n = (44 * (t^3)) + 12.5 ;$$

$$\text{cond} = \text{ico} = 5, \text{diff}(n, t, 1) = -0.5 ;$$

y(0) = solve (eqn cond)

$$t = 0 : 0.1 : 1.5$$

Peace = subs (y(0))

fplot (Peace)

grid on

legend ('Peace', 'location', 'best')

$$\text{Peace} = 3 * t^2 - \exp(-3 * t) * (3.5) - (13 * t) / 2 - 12 * t^3 + 3 * \exp$$

(4 \* t)

### Question (4b)

command window:

clc ;

clear ;

close all ;

syms x(t) y(t)

$$\text{eqn 1} = \text{diff}(y, t) - 2 * x = \exp(-2 * t) ;$$

$$\text{eqn 2} = \text{diff}(x, t) + y = \exp(t) ;$$

$$\text{eqn 3} = \text{Legn 1} = \text{eqn 2}$$

$$\text{cond} = x(0) = 0, y(0) = 0 ;$$

Ans = solve (eqns cond)

$$x(\text{sol}(t)) = \text{Ans } x$$

$$y(\text{sol}(t)) = \text{Ans } y$$

Spring + S

$$F = P_i \cdot \left( (s^2 + 15s + 24) \cdot P_i + s + 24 \cdot (P_i \cdot 3) \right)$$

iLaplace (CF)

Simplify (cons)

pretty (cons)