

### Question 4B

```
1. Command window
2. clc
3. clear
4. close
5.
6. syms x(t) y(t)
7. eqn1 = diff(y,t) - x == exp(-2*t);
8. eqn2 = diff(x,t) + y == exp(-t);
9. eqns = [eqn1 eqn2]
10. Ans = cond = x(0) == 0, y(0) == 0;
11. Ans = solve(eqns, cond)
12. xSol(t) = Ans.x
13. ySol(t) = Ans.y
```

(a)

(ii) Visualizing the solution on graph separately continue with

```
14. fplot(xSol)
15. fplot(ySol)
16. grid on
17. legend('xSol', 'Location', 'best')
18. legend('ySol', 'Location', 'best')
```

(iii) Visualizing the solution on graph together continue

```
14. fplot(xSol)
15. fplot(ySol) hold on
16. fplot(ySol)
17. grid on
```

Syms n(t)

$$\text{eqn} = \text{diff}(n, t, 2) - \text{diff}(n, t) - 12 * n = 144 * (t^3) + 12.5;$$

$$\text{cond} = n(0) == 5, \text{diff}(n, t, 2) == -0.5;$$

$$y_{\text{sol}} = \text{dsolve}(\text{eqn}, \text{cond})$$

$$t = 0 : 0.1 : 0.5$$

$$y_{\text{emi}} = \text{subs}(y_{\text{sol}})$$

$$\text{fplot}(y_{\text{emi}})$$

grid on

$$\text{legend}('y_{\text{emi}}', 'Location': 'best')$$

(i) Command window

clc

clear

close all

Syms t s w n k a

~~F = Laplace(x,t,s)~~

$$x = k * \exp(-a * t) + \sin(5 * w * t) + \cos(3 * w * t)$$

F = Laplace(x, t, s)

Simplify(F)

Pretty(ans)

(ii) Command window

clc

clear

close all