

Question 4B

1. Command window
2. Clc
3. Clear
4. Close
- 5.
6. Syms x(t) y(t)
7. eqn1 = diff(y,t) - 2*x == exp(-2*t);
8. eqn2 = diff(x,t) + y == exp(-t);
9. eqns = [eqn1 eqn2]
10. Conds = x(0) == 0, y(0) == 0;
11. Ans = dsolve(eqns, Conds)
12. xSol(t) = Ans.x
13. ySol(t) = Ans.y

(a)

- 11) 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')

- 1) Visualizing the solution on graphs together continue
14. fplot(xSol)
15. fplot(xSol, ySol) hold on
16. fplot(ySol)
17. grid on

Question 4a

Command Window

clc

clear

close all

Syms n(t)

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

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

ySol = dsolve(eqn, cond)

t = 0: 0.1: 0.5

Yemi = Subs(ySol)

fplot(Yemi)

grid on

legend('Yemi', 'Location', 'best')

Question 4c

(i) Command window

clc

clear

close all

Syms t s w k a

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

$$x = k \cdot \exp(-a \cdot t) + \sin(5awt) + \cos(3wt)$$

F = Laplace(x,t,s)

Simplify(F)

Pretty(ans)

(ii) Command window

clc

clear

close all

Syms t s

$$F = \pi \cdot / ((s^2) + 15 \cdot \pi \cdot s + 24 \cdot (\pi^3))$$

ilaplace(F)

Simplify(ans)

Pretty(ans)