

15. Legend ('x', 'y', 'z', 'Location', 'best')

### Question 4c

(a) Command window

clc

clear

close all

Syms t s w x k a

$x = k \exp(-a \cdot t) + \sin(s + w \cdot t) + \cos(2 \cdot w \cdot t)$

$F = \text{Laplace}(x, t, s)$

Simplify(F)

Pretty(ans)

(b) Command window

clc

clear

close all

Syms t s

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

ilaplace(F)

Simplify(ans)

Pretty(ans)

### Question 110

```
1. from sympy import *
2. t = symbols('t')
3. x = symbols('x')
4. eq1 = diff(x, t) - 2*x = exp(-2*t)
5. eq2 = diff(x, t) + y = exp(-t)
6. eqs = [eq1, eq2]
7. ans = dsolve(eqs)
8. cond = x(0) = 1, y(0) = 0
9. ans = dsolve(eqs, cond)
10. x_sol = ans[0]
11. y_sol = ans[1]
```

(a)

(ii) Visualizing the solution on graph separately continue with

14. `fplot(x_sol)`
15. `fplot(y_sol)`
16. `grid on`
17. `Legend('x_sol', 'Location', 'best')`
18. `Legend('y_sol', 'Location', 'best')`

(iii) Visualizing the solution on graphs together continue

14. `fplot(x_sol)`
15. `fplot(y_sol) hold on`
16. `fplot(y_sol)`
17. `grid on`

Question 4a

Command Window

clc

clear

close all

Eqn = diff(n,t,2) - diff(n,t) - 12\*n + 144 + (t^2) + 12.5;

Cond = n(t) == 5; diff(n,t,2) == 0.5; % (t, n) = 4h

plot = solve(Eqn, Cond)

t = 0:0.1:4.5

Yeni = Subs(plot)

fplot(Yeni)

grid on

legend('Yeni', 'Location', 'best')