

Assignment 4

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Mechanical Engineering

17ENGG06109 / 3002

a) Command window

clc

clear

close all

Syms n(t)

$$\text{eqn} = \text{diff}(C_n, t, 2) - \text{diff}(C_n, t) - 12 \cdot n = (4 \cdot t^3) + 12.5;$$

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

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

$$t = 0:0.1:1.5$$

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

$$\text{fplot}(\text{David})$$

grid on

legend('David', 'Location', 'best')

B) Command window

clc

clear

close

Syms x(t) y(t)

$$\text{eqn1} = \text{diff}(C_x, t) - 2 \cdot x == \exp(-2 \cdot t);$$

$$\text{eqn2} = \text{diff}(C_y, t) + y - \exp(-t)$$

$$\text{eqn3} = [\text{eqn1}, \text{eqn2}]$$

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

$$\text{Ans} = \text{dsolve}(\text{eqn3}, \text{Cond})$$

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

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

ii) Visualizing the solution on graph separately Continue with
fplot(Cxsol)
fplot(Cysol)
grid on
legend(Cxsol, 'Location', 'best')
legend(Cysol, 'Location', 'best')

iii) Visualizing the solution on graph together Continue with
fplot(Cxsol)
hold on
fplot(Cysol)
grid on
legend(Cxsol, 'xsol', 'Location', 'best')

~~Question 2~~

c)
i) Command window
dc
clear
close all

syms t s w x k a

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

F = Laplace(x, t, s)

Simplify(F)

pretty(ans)

a) Command window

clc

clear

close all

Syms t s

$$F = pi * / (Cs^2) + 15 * pi * s + 24 * (pi^3)$$

ilaplace (F)

Simplify (ans)

pretty (ans)