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Civil Engineering

17/ENG03/052

ENG 361

Question 4

a) i) - command window

clc

clear

close all

syms n(t)

eqn = diff(n,t) - 12*n = 144*(t+3) + 12.5;

cond = n(0) == 5, diff(n,t,2) == -0.5;

y_sol = dsolve(eqn, cond)

t = 0:0.1:1.5

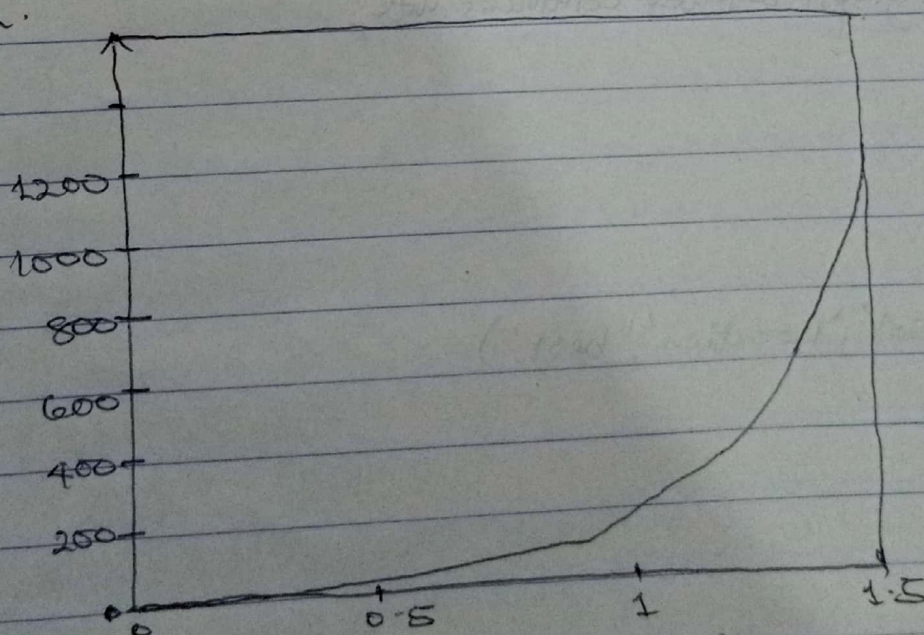
Yermien = subs(y_sol)

fplot(Yermien)

grid on

legend('Yermien', 'Location', 'best')

ii) Graph.



b) i) - command window

clc

clear

close all

syms x(t), y(t)

eqn 1 = diff(y,t) - 2*x == exp(-2*t);

eqn 2 = diff(x,t) + y - exp(-t);

eqns = [eqn1, eqn2]

cond = x(0) == 0, y(0) == 0;

Ans = dsolve(eqns, cond)

x_sol(t) = Ans x

y_sol(t) = Ans y

ii) Visualizing the solution on graph goes on as;

- fplot(x_sol)

fplot(y_sol)

grid on

legend('x_sol', 'Location', 'best')

legend('y_sol', 'Location', 'best')

iii) Visualizing the solution on graph together continues with;

- fplot(x_sol)

- hold on

fplot(y_sol)

grid on

legend('x_sol', 'y_sol', 'Location', 'best')

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c) i) - command window

clc

clear

close all

syms t, s w x k a

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

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

simplify(F)

pretty(ans)

ii) - command window

clc

clear

close all

syms t s

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

iLaplace(F)

simplify(ans)

pretty(ans)