

Mechanical Engineering
ENG 381: Engineering Mathematics III

LMS ASSIGNMENT

Question 4

Command window

clc

clear

close all

Syms n(t)

$$\text{eqn} = \text{diff}(n, t, 2) - \text{diff}(n, t) - 12 * n = 144 * (t^3) + 12 * 5;$$

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

ySol = dsolve (eqn, cond)

t = 0: 0.1: 15

chris = subs (Ysol)

plot (chris)

grid on

legend ('chris', 'For')

Question 4b

Command window

clc

clear

close all

Syms n(t), y(t)

$$\text{eqn 1} = \text{diff}(y, t) - 2 * x == \exp(-2 * t);$$

$$\text{eqn 2} = \text{diff}(x, t) + y * \exp(-t);$$

eqn 3 = [eqn 1, eqn 2]

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

Ans = dsolve (eqns, cond)

$$x_{sol}(t) = A n s x$$

$$y_{sol}(t) = A n s y$$

Question 4c

i) Command window

clc

clear

close all

Syms t s w x Ka

$$x = u * e^{a*t} * \sin(s*w*t) * \cos(3*w*t)$$

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

simplify(F)

Pretty(ans)

ii) Command window

clc

clear

close all

Syms t s

$$F = p_i * ((s^2) + 15 * p_i * 5 + 24 * (p_i^3))$$

i laplace(F)

simplify(ans)

Pretty(ans)