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MECHATRONICS ENGINEERING

16/ENG05/032

QUESTION 1

commandwindow

clear

clc

close all

syms y(t)

T1 = diff(y,t,1)

T2 = diff(y,t,2)

d = [T2 + (5\*T1) + (6\*y)== cos(t)]

dy = diff(y,t)

dcond = [y(0)==5,dy(0)==3]

solution = dsolve(d,dcond)

pretty(solution)

tn = [0:0.1:50]

z = subs(solution,tn)

figure(1)

plot(tn,z)

xlabel('time(min)')

ylabel('vibrations')

grid on

grid minor

axis tight

QUESTION 2

syms T1(t) T2(t)

dT2 = diff(T2,t)

dT1 = diff(T1,t)

g = [dT1 + (3\*T2) == exp(-2\*t) , dT2 - (3\*T1) == exp(2\*t)]

gcond = [T2(0) == 30 , T1(0) == 30]

d = dsolve(g,gcond)

T2 = d.T2

T1 = d.T1

pretty(T2)

pretty(T1)

tn = [0:0.1:3.5]

k1 = subs(T1,tn)

k2 = subs(T2,tn)

figure(1)

plot(tn,k1,tn,k2)

grid on

grid minor

axis tight

xlabel('Time(hour)')

ylabel('Temperature(degree celsius)')

legend('T1(degree celsius)','T2(degree celsius)')

QUESTION 3

syms I(t) L R E

df = [diff(I,t)\*L + R\*I == E]

dfcondition = [I(0) == 0 ]

dg = dsolve(df,dfcondition)

pretty(dg)

QUESTION 4

syms t w a k

f = k\*exp(-a\*t)\*cos(w\*t)

fs = laplace(f)

pretty(fs)

QUESTION 5

syms s pi

f = pi/(s^2+(10\*pi\*s)+(24\*pi^2))

bd = ilaplace(f)

pretty(bd)



