

a) Matlab mfile program to convert
 $f(t) = k e^{at} \sin(\omega t) \cos 3\omega t$
and $f(s) = \frac{\pi}{(s^2 + 15s + 24)^2}$

command window

clear

clc

syms k a t f(t) f(s)

$z = k \cdot \exp(a \cdot t) \cdot \sin(s \cdot \omega \cdot t) \cdot \cos(3 \cdot \omega \cdot t)$

laplace(z)

command window

clear

clc

syms f(s)

$u = (3.142) / ((s^2) + 15 \cdot 3.142 + s + 24 \cdot (3.142))$

laplace(u)

4b)
command window
etc
clear
close

Syms x(t) y(t)
eqn1 = diff(y,t) - 2*x == exp(-2*t);
eqn2 = 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

visualizing the solution on graph separating continue

with

fplot(x_sol)

fplot(y_sol)

grid on

legend('x_sol', 'location', 'best')

legend('y_sol', 'location', 'best')

visualizing the solution on graph together continue

with

fplot(x_sol)

hold on

fplot(y_sol)

grid on

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

4a)

command window

clc

clear

clear all

syms n(t)

 $D = \text{diff}(n)$

$$\text{ode} = (\text{diff}(n, t, 2)) - (\text{diff}(n, t)) - (12 * n)$$

$$== 144 * (t^3) + 12 * 3;$$

$$\text{cond1} = D(n) == -0.5;$$

$$\text{cond2} = n(t) == 5;$$

$$\text{conds} = [\text{cond1}, \text{cond2}];$$

~~dsolve~~ dsolve(t) = dsolve(ode, conds);

~~daw1~~ daw1 = simplify(dsolve(t))

$$t_n = [0 : 0.1 : 1.5]$$

Tega = subs(dsolve, t_n)

plot(t_n, Tega)

grid on

