

Etak Gabriel Edna  
Petroleum Engineering  
17/ENG07/011

### Question 4.

(4a)

Command Window  
clc  
clear  
close all

Syms n(t)

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

$$\text{cond} = n(0) == 5; \text{diff}(n,t,2) = -0.5^2;$$

ysol = solve (eqn, cond)

$$t = 0:0.1:1.5$$

Year = subs (ysol)

Fplot (Year)

grid on

legend (Year, 'location: best')

(4b)

Command Window  
clc  
clear  
close all

Syms n(t) y(t)

$$\text{eqn1} = \text{diff}(y,t) - \lambda + \lambda == \exp(-\lambda t);$$

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

$$\text{eqns} = [\text{eqn1}; \text{eqn2}];$$

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

Ans = solve (eqns, cond)

$$X_{sol}(t) = A \cos t + X_{sol}(t) - A \cos t + y$$

II) Visualizing the Solution on graph separately  
 once per  $t$

- F plot (Xsol)
- F plot (ySol)
- grid or
- (equal (Xsol), 'looping' (plot))
- (equal (ySol), 'looping' (plot))

III) Visualizing the solution on graphs together (compare)

- F plot (Xsol)
- F plot (ySol)
- grid on
- (equal (Xsol), 'ySol', 'looping', 'best')

LT C

Command window

LT C

Clear

close all

sgn sol + s ~~ode~~ s c k a

$x'' - k + \cos(x - ct) + \sin(5t) + \cos(3t)$

F - laplace (X, t, s)

Simplify (E)

pretty (ans)

sgn s + s

$F = R + / (15^2 + 15 + R + S + 24 + (12/13))$

laplace (F)

Simplify (ans)

pretty (ans)