

People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

University of Batna 2 Common Core of Science and Technology
Faculty of Technology Engineering Section

Module: Calculus 2 (Analyse 2)

Tutorial Session N°3

Exercise n°1

Solve the following differential equations.

- a. $\frac{d^2y}{dx^2} = \sin(2x)$ initial conditions $y(\pi) = 0, y'(\pi) = 1$
b. $\frac{d^4y}{dx^4} = 3x - 1$ initial conditions $y(0) = y'(0) = y''(0) = y'''(0) = 0$

Exercise n°2

Solve the following differential equations.

- a. $y'' - 5y = 0$
b. $2\frac{d^2y}{dx^2} + 5\frac{dy}{dx} = 0$
c. $9y'' - 12y' + 4y = 0$
d. $y^{(5)} - 2y^{(4)} + y^{(3)} = 0$
e. $D^2(D + 1)^3(D - 2)(3D + 5)(2D - 3)y = 0$
f. $(D^3 - 11D^2 + 31D - 21)y = 0$
g. $(4D^3 - 24D^2 + 35D - 12)y = 0$
h. $y'' - 4y = 0$ initial conditions $y(0) = y'(0) = 4$.
i. $(D - 1)^2(D + 2)y = 0$ initial conditions $y(0) = y'(0) = 0, y''(0) = 9$

Exercise n°3

Solve the following differential equations.

- a. $9y'' + y = 0$
b. $y^{(4)} - 16y = 0$
c. $(D^2 + 1)(D^2 + D + 1)y = 0$
d. $(D^2 + 4D + 5)^2y = 0$
e. $(D^3 - D^2 + 9D - 9)y = 0$
f. $(D^4 - 1)y = 0$
g. $(D^2 + 1)^4y = 0$
h. $16y'' + y = 0$ initial conditions $y(0) = 2 \quad y'(0) = 9$