

Assignment · NO :- 1 .

Name :- Ahmad Ali .

ID :- 7746 .

Dept :- Civil Engineering .

Subject :- Differential Equation .

①

## → Ordinary Differential Equ :-

An equation contains only ordinary derivatives of one or more dependent variables of a single independent variable.

For exp:-

$$\frac{dy}{dx} + 5y = e^x, \quad \left(\frac{dx}{dt}\right) + \left(\frac{dy}{dt}\right) = 2x + y$$

## → Application's :-

→ Modelling with first-order Equation:-

- ① Newton's Law of cooling.
- ② Electrical Circuits.

→ Modelling free mechanical Oscillations:-

- ① No damping.
- ② Light damping.
- ③ Heavy damping.

→ Modelling forced mechanical oscillations.

→ Computer Exercise or Activity.

(2)

## → Partial Differential Equ

An equation contains partial derivatives of one or more dependent variables of two or more independent variables.

For exp:-

$$\frac{\sigma^2 U}{\partial x^2} + \frac{\partial^2 U}{\partial t^2} = 2 \frac{\partial U}{\partial t} \quad \frac{\partial U}{\partial y} = - \frac{\partial V}{\partial x}$$

## → Application's:-

PDE's are used to model many systems in many different field of science and engineering.

→ Laplace Equ.

→ Heat Equ.

→ Wave Equ.

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