Assignment #1

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Section:- B

Submitted to:-

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Subject:-

Differential Equation

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Application of ODE's in engineering

★ The ode's have wide application in various engineering and science disciplines It is practically important for engineering to be able to model physical problem and then solve these equation so that the behaviour of the system concerned can be studied

★ Application of differential equations. we present example where differential equation are widely applied to model natural phenomena. engineering system and many other situation.

Application of ODE

1. Newton' law of cooling (2) Beam
3. Physical Application (4) Radio Active element
5. Electrical circuit
6. Modelling free Mechanical oscillations.
7. No Damping (8) light Damping (9) heavy Damping
10. Modelling forced mechanical oscillations
11. compute Exercise or Activity
12. Modelling with first-order equation

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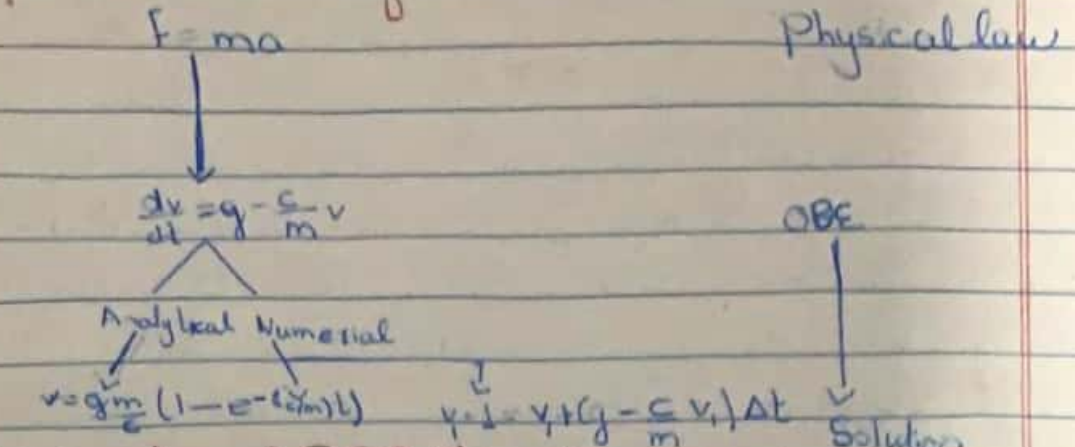
* Application of ODE's in engineering problem solving:



= Application of PDE's in engineering.

In many engineering or science problem such as heat transfer, elasticity, quantum mechanics, water flow & other, the problem are governed by partial differential equation. by nature, this type of problem is much more complicated then the previous ODEs

There are several major method for the solution of PDE:

→ Including Separation of veriable.
→ Method of characteristic.
→ Super position principle.
→ Integral transform.
→ change of variable.
→ Lie group method.

* Although the existence and uniqueness

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of solution of ODEs is well established. but that is not the case for many pdE's. In fact analytical solution are not available for many pdEs which is well. Known fact, particularly when the solution domain is non regular or homogeneous or the material properties change withe the solution step

Important Example

pDE are used to model many system in many different fields of science and engineering

Example

→ laplace equation
heat equation
wave equation.