

Motivation

The subject of differential equations has vast applications to the real world problems. Differential equations are used not only in physics but also in chemistry, biology, economics, engineering etc.

Differential equations are used to model real world problems. Solutions of differential equations are compared with the actual behaviour of the corresponding system to determine if the formulation in terms of differential equations is accurate. The solutions of the differential equations are used to predict the behaviours of the system at a future time, or at an unknown location, or under some applied constraints. Few of the applications of differential equations are given below.

1. Radioactive decay of radioactive elements such as Uranium
2. Motion of a body
3. Population models
4. Prediction of weather
5. Prediction of stock prices
6. Fluid flow (e.g. Flow in a river), motion of a aeroplane, blood flow, swimming of animals, air flow in lungs, etc.
7. Atmospheric pollution
9. Electric field and potentials
10. Diffusion of materials
11. Heat flow and distribution
12. Deformation of a body, elasticity
13. Modelling cancer growth
14. Pattern formation (e.g. stripes in Zebra, spots in Leopards)
15. Drug delivery to parts of body
16. Propagation of sound through a medium
17. Enzyme Kinetics
18. Epidemic models
19. ...