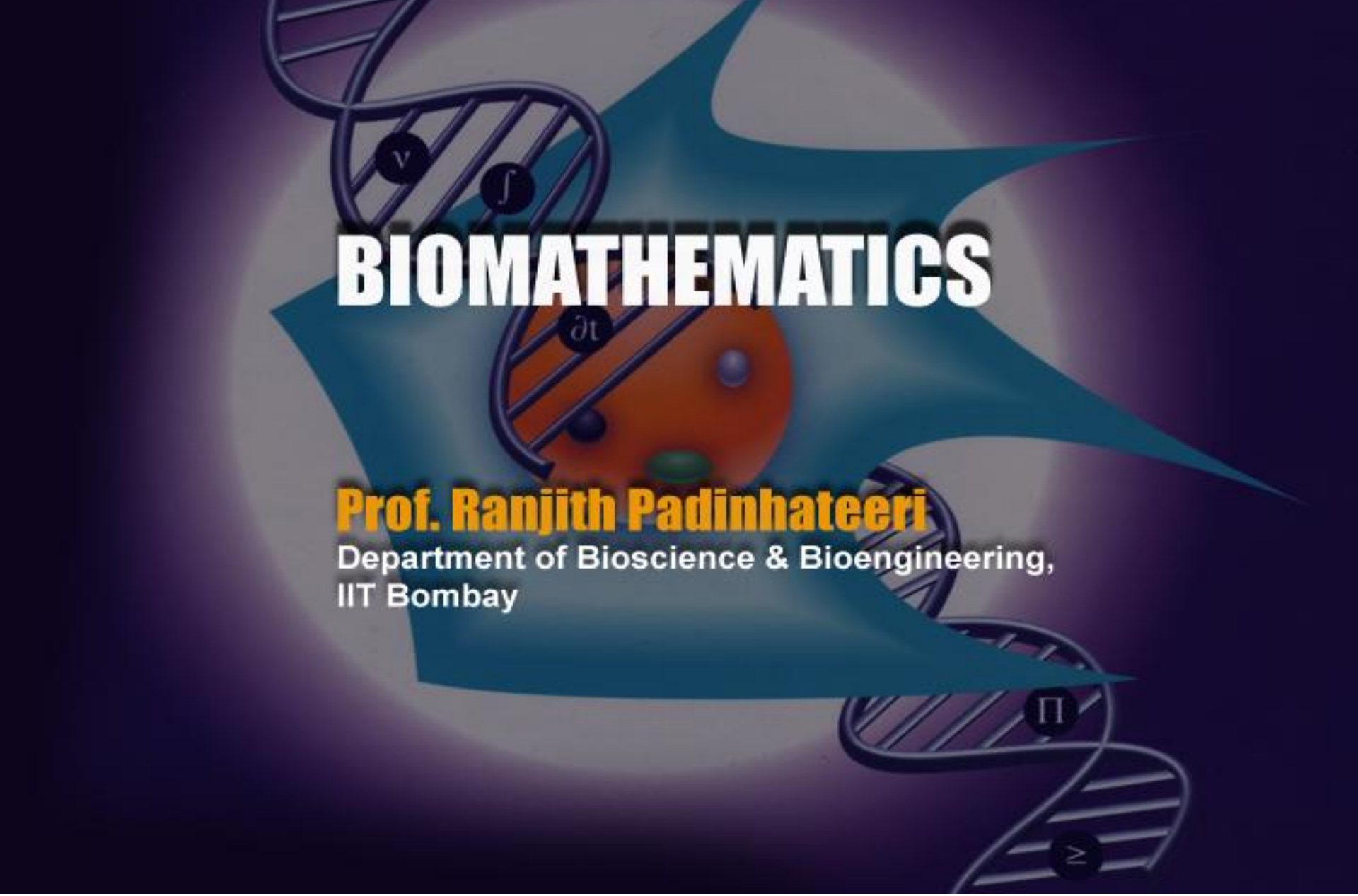
BIOMATHEMATICS
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Lecture 32

Tutorial and discussion

Q.1 : Dynamic instability

Microtubules exhibit a phenomenon called "dynamic instability". In this, first, tubulin monomers polymerize and grow, with some speed, to a microtubule filament of certain length; then suddenly depolymerize and shrink to a very small filament. Then again starts growing, and then shrink again. This process of slow growth followed by sudden shrinkage is repeated. This is called dynamic instability.

Q.1 : Dynamics instability

(a) Plot a schematic graph of length vs time of a microtubule filament doing this dynamic instability

(b) Also plot the derivative of the length vs time graph

Plot a rough sketch of the two following functions in the same graph

$$y(x) = \sin(x)$$

$$y(x) = \sin^2(x)$$

Find the derivative of the following series

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \frac{x^6}{6} + \ldots$$

In Biology, typically, enzyme kinetics is described using Michaelis-Menten equation

$$v(S) = \frac{V_m S}{K_m + S}$$

Schematically plot the function

In Biology, typically, enzyme kinetics is

$$v(S) = \frac{V_m S}{K_m + S}$$