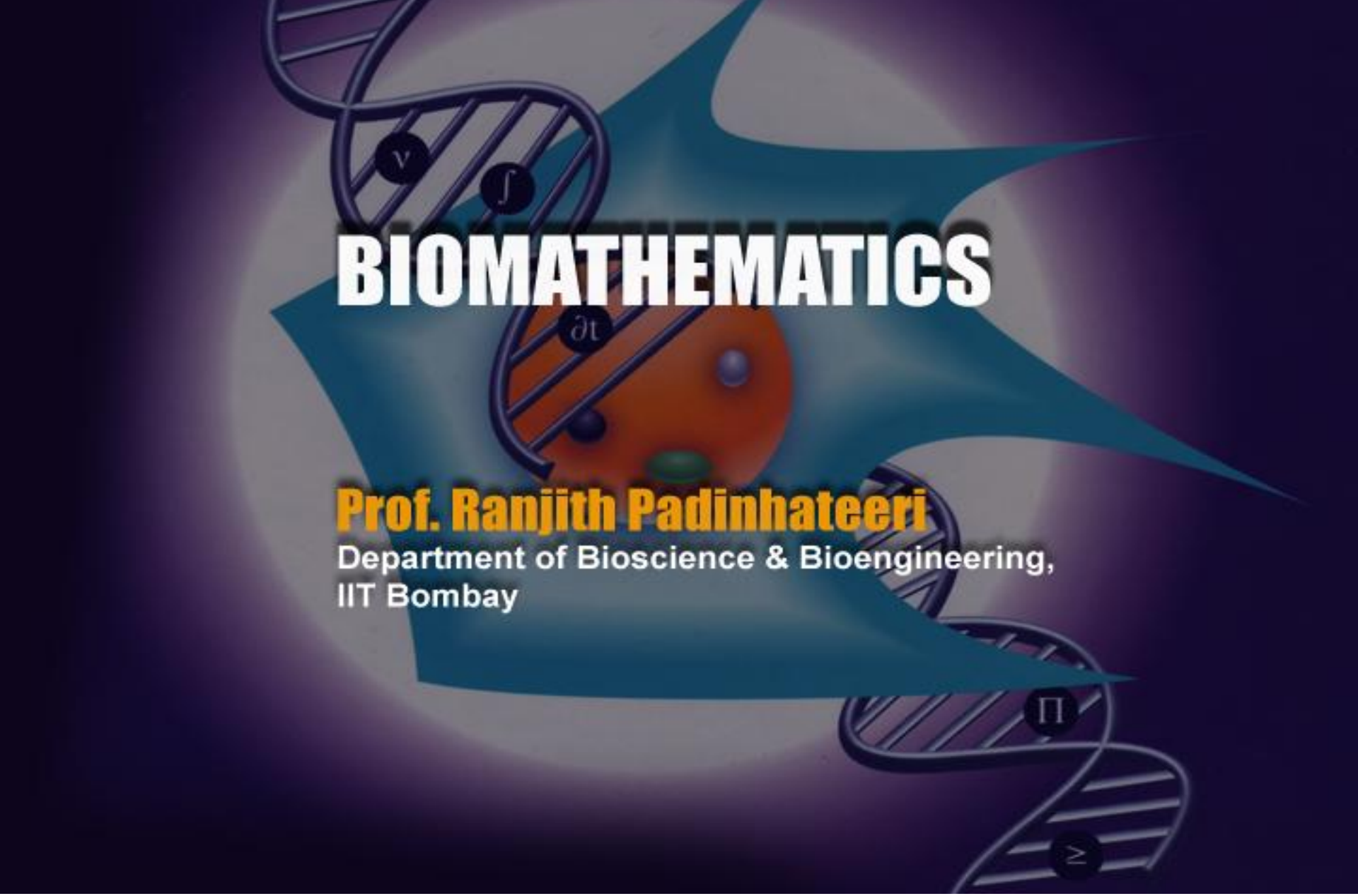
BIOMATHEMATICS
Prof. Ranjith Padinhateeri
Department of Bioscience & Bioengineering,
IIT Bombay

Lecture 33

Tutorial and discussion

Force on chromosomes

In mathematics we use vectors to specify direction of various quantities such as force. Imagine a cell with only two chromosomes. During cell devision, the chromosomes are pulled apart by a pulling force generated by cytoskeletal machinery.
Can you write down an expression for forces on chromosome 1 and chromosome 2, in this case.
You may assume that the magnitude of the force is constant. You need to specify the direction using vector notation.

Diffusion and viscous drag

Some proteins do diffuse along DNA. Typical diffusion coefficient measured in some cases is: 10^{-12} cm^2/s

What is the viscous drag that is being felt by the proteins ?

Diffusion coefficient

Imagine that you are cooking potato adding salt and spices. Assume that it takes about 1 hour for the spice powder particles to diffuse into the potato pieces. Assuming that potato pieces have a radius of 2 cm, calculate the diffusion coefficient of spice powder particles inside the potato

Diffusion coefficient

Imagine that you are cooking potato adding salt and spices. Assume that it takes about 1 hour for the spice powder particles to diffuse into the potato pieces. Assuming that potato pieces have a radius of 2 cm, calculate the diffusion coefficient of spice powder particles inside the potato

Diffusion coefficient

Imagine a 1-dimensional tube through which a particular protein is diffusing. At a given time the protein concentration is given by

$C(x) = -10\ x + 100$

Calculate the current J(x).
Will the concentration change with time ?

Do the same for $C(x) = 10\ x^2$