

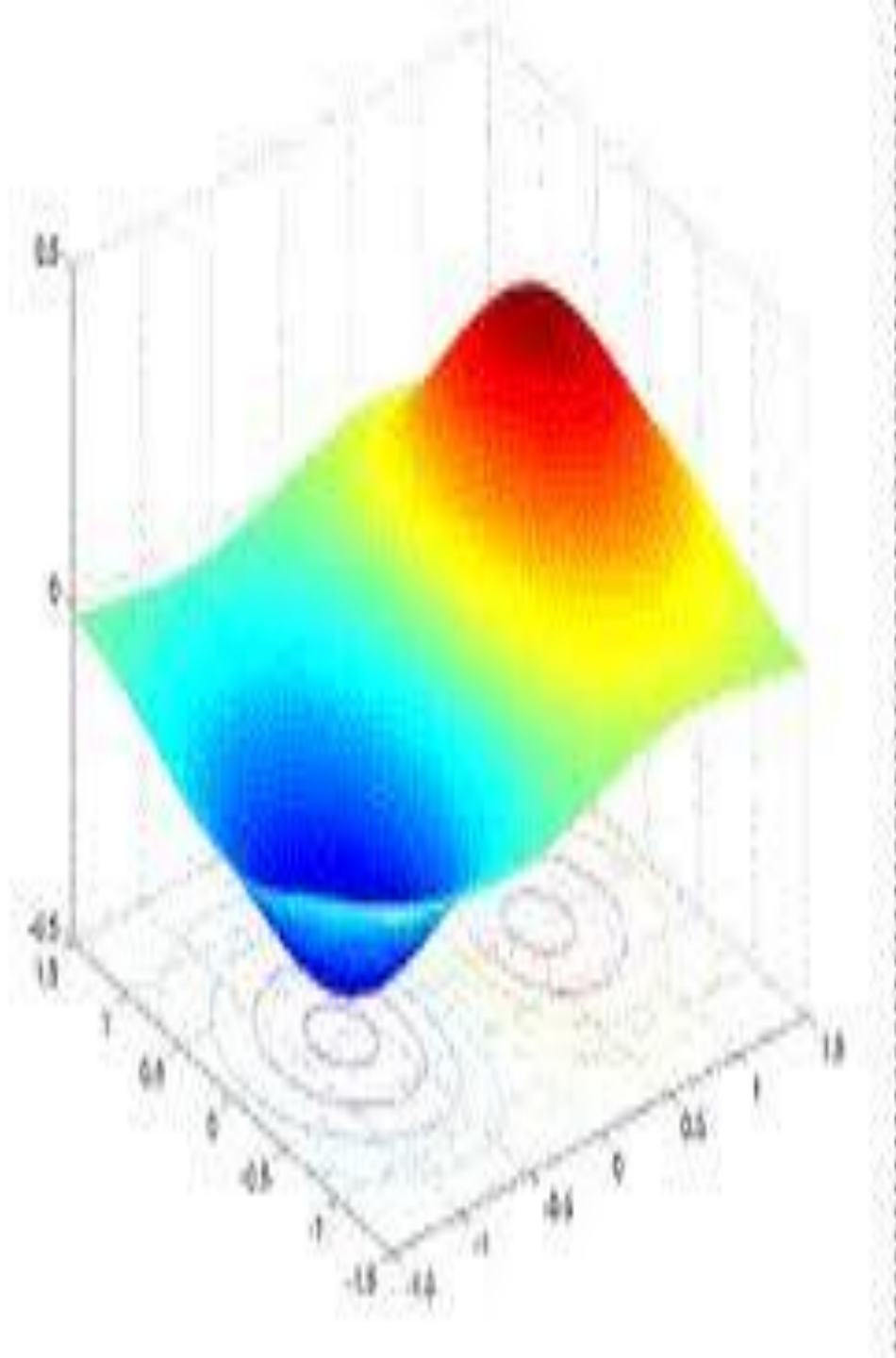


Modelling and Simulation

CO-207 | SEMESTER-III

TEACHER INCHARGE: DIPIKA JAIN

DELHI TECHNOLOGICAL UNIVERSITY



COURSE OUTCOMES:

1. To understand and classify various simulation modelling techniques.
2. To outline steps in a simulation study and illustrate Discrete event simulation.
3. To construct a model for complex systems and experiment with simulation language.
4. To analyze random numbers generation using different statistical techniques.
5. To evaluate simulation output and validate the system.

Outline of Semester

COMPONENTS	MARKS
CWS	25 [Attendance (5); TA (5); Assignment/Tutorial etc. (15)]
MTE	25 [Report + Presentation + Viva]
ETE	50 [3 Class Test (best 2 CT) + 2 Minor Test (Best 1 MT)]
Total	100

MTE

Choose a research paper as per your research interest on any of the topic of your interest:

- ❖ Augmented Reality
- ❖ Blockchain
- ❖ Data Analysis
- ❖ Internet of Things
- ❖ Networking
- ❖ Virtual Reality

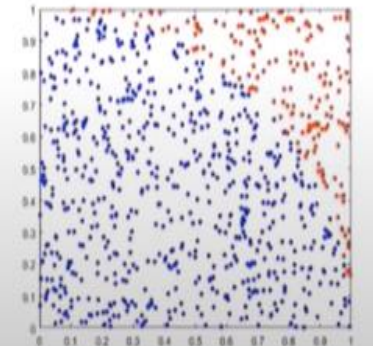
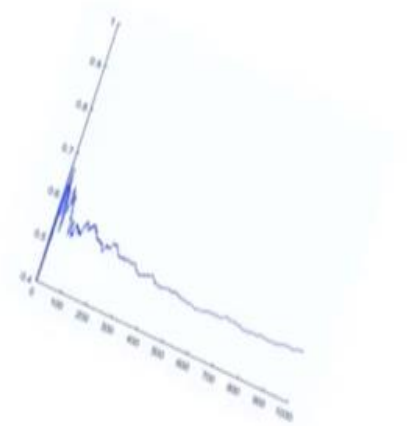
Refer good Journal papers of reputed publishers.

Introduction to Modelling and Simulation

What is modelling?

Mathematical Modelling: What, why and how?

Applications



What is modelling?

What is a model?

- Replication of something which is happening in real.
- Representation used to visualize something.
- An abstract representation of something. E.g.: your science models in school life.

Some examples of Model

1. Prototype OR Physical Model

- It can be touched, felt : model of bridge or model of periscope etc



2. Schematic Model

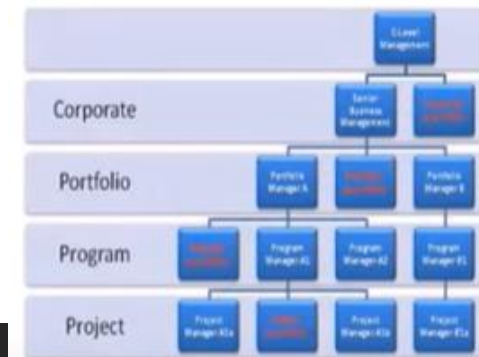
- Provides means of visualizing system structure. Examples: Organizational Charts, GPS, Geographical diagrams, graphs etc.



3. Mathematical Model

- Representation of the behaviour of real objects and phenomenon in mathematical language.

Algebraic Equations, Differential Equations, Theorems, Algorithms etc.



Why Mathematical Model ?

Direct experimentation is

- time-consuming,
- expensive,
- often even dangerous, or
- simply impossible.



Think about
launching a satellite
without prior
mathematical computations!!

Think of a real situation where it is dangerous to perform direct experiment without prior testing (through computer simulation/ mathematical model)

Applications

- Epidemiology
- Biological transport
- Vehicular traffic
- Optimal strategies in business
- Economics
- Financial industry
- Engineering
- Software development

Objectives of Mathematical Modelling

Mathematical Modelling is a process that uses the language of mathematics to:

- Analyze
- Make Predictions
- Provide insight of real-world phenomenon

