

# Importance & Limitations of Mathematical Models

## Importance:

⇒ Mathematical models are important because they help to explain physical phenomena and predict their behaviour in time.

⇒ They help us estimate uncertainties in observational data and uncertainties in calculation based on observational data. And also to characterize numerical output from mathematical models to help understand the model behavior and to assess the model's ability to simulate important features of natural system (model validation)

⇒ Mathematical models can help students understand and explore

the meaning of equations or functional relationships.

After developing a conceptual model of a physical system it is natural to develop a mathematical model that will allow to estimate quantitative behavior of system.

Quantitative results from mathematical models can easily be compared with observational data to identify a model's strength and weaknesses.

Mathematical models are important component of final "complete model" of a system which is actually a collection of conceptual, physical, mathematical, visualization and possibly statistical sub-models.

## Limitations:-

Limitation of a mathematical model is that it pertains to observations made in the past and so it can be used for policy making and not for decision making which requires observations or situations.

Mathematical models cover such a wide range of techniques, the only known limit on their use in the physical and biological sciences are limits on present technology the limits given by physical laws, limits given by complexity and finally the limit of computation.