Unit - II

SYSTEM MODELLING

Introduction:-

- last 50 years has allowed modelling and simulation to penetrate the majority of engineering disciplines and natural sciences.
- The simulation is often also used as a substitute for experiments on an existing system.
- some system states cannot be brought about in the real system, or at least not in a non-destructive manner.
- simulated models are fully monitorable, controllable, virtual experiments are repeatable.

Disadv:-

- Each virtual experiment requires a complete, validated & verified modelling of the system.

* Reality is initially an entity, situation or system to be investigated by simulation.

- In first stage, reality is analysed and modelled using verbal descriptions, equations, relationships or laws of nature, which initially establishes a conceptual model.
- The degree of correspondence b/w conceptual model & reality that should be achieved for the selected field of application, has to be defined.

- A conceptual model is adequately qualified for a predetermined field of appl^{n} if it produces the required degree of correspondence with reality.

- In second stage of modelling the conceptual model is transformed into an executable (i.e) simulatable model as part of implementation.

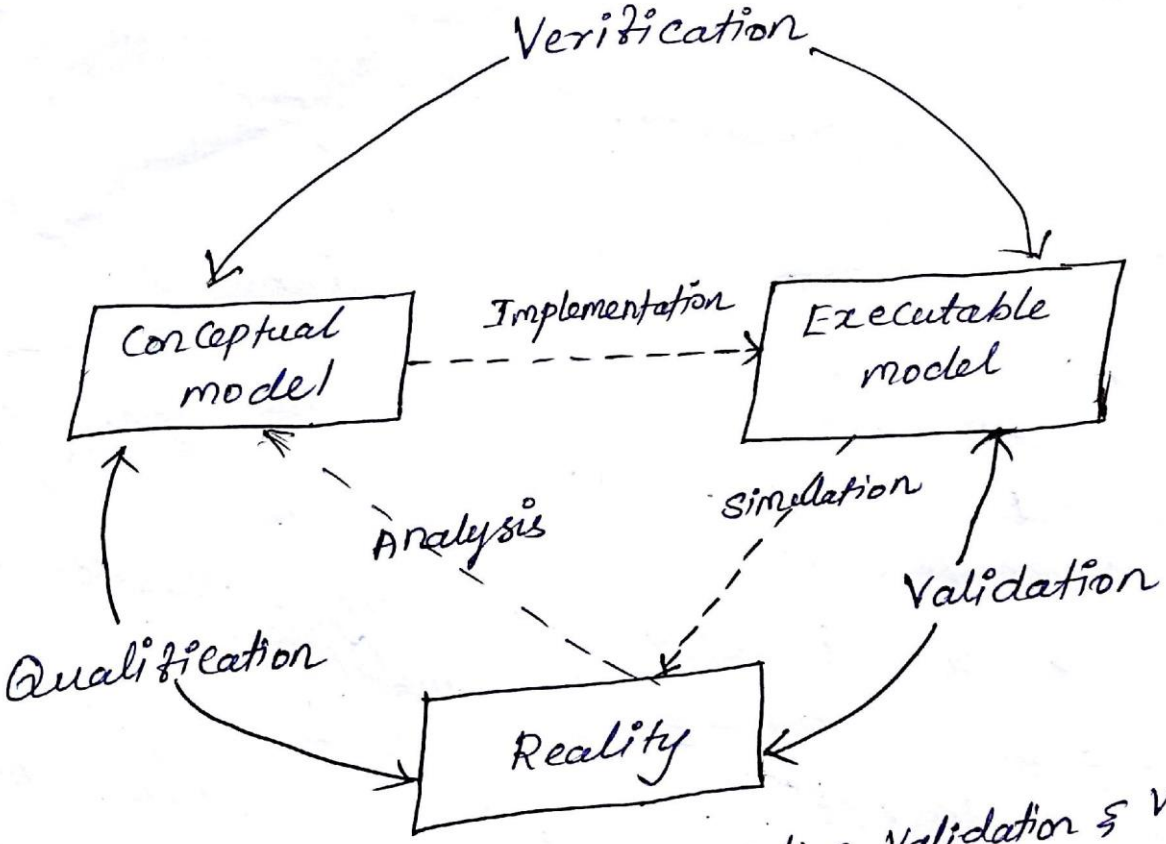

Fig. Model generation, simulation, validation & verification

- Model verification investigates whether the executable model reflects the conceptual model within the specified limits of accuracy.

- verification transfers the conceptual models of appl^{n} to the executable model.

- model validation, on the other hand, should tell us whether the executable model is suitable for fulfilling the envisaged task within its field of application.

* verification - ensures the system is modelled right.
* validation - is all about modelling the right system.