Youtube link;

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https://www.youtube.com/playlist?list=PLKhY2buiByja5XjNv0uq2fdPh9cGjDJxF

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20th October, 2024, video 01, Simulation modeling 01 what is simulation

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1. What is simulation?
   1. The definition of simulation
   2. when simulation is not appropriate?
   3. Advantages and disadvantages of simulation
   4. Areas of Application
2. The system concept
   1. The definition of system
   2. Components of a system
   3. Discrete and continuous systems
3. The model of a system
   1. The definition of model
   2. Types of models
   3. Types of simulation models
4. Discrete-event system simulation
   1. The definition of discrete-event system simulation
   2. Steps of discrete-event system simulation

# The definition of simulation

* A simulation is the imitation of the operation of a real-world system over time. It involves:

1. The generation of an artificial history of a system,
2. The observation of the artificial history to draw inferences on operating characteristics of the system.

* What is “system”?
* What is an “artificial history” and how can it be generated?
* The behavior of a system (as it evolves over time) can be observed through a simulation model.

1. The model helps to investigate a variety of “what if” questions about the real-world system.
   1. What would be the impact of the changes in the system to the performance?

* Some models are simple and can be solved by mathematical methods.

1. Probability theory, differential calculus, mathematical programming, etc.

* Many real-world systems are so complex.

1. The problems of corresponding systems can be solved with computer-based simulation models.

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20th October, 2024, video 02, simulation modeling when simulation is not appropriate?

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# When simulation is not appropriate?

According to banks and Gibson (1997), one should not use simulation when:

1. The problem can be solved by a common sense or analytical solution.
2. It is less expensive to implement direct experiments.
3. The costs exceed expected savings after the simulation project.
4. The necessary resources or time is unavailable.
5. The simulation model is not validated.
6. The system behavior is too complex to model.

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20th October, 2024, video 03, simulation modeling 03 advantages of simulation

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# Advantages of simulation

According to pegden et al. (1995), some advantages of simulation are:

* New policies (operating procedures, decision rules, etc. (of a system can be explored without disrupting the real system.
* New system designs (physical layout, hardware design, process design, transportation systems, etc.) can be tested without committing resources for their acquisition.
* Hypotheses about how or why certain phenomena occur can be tested for feasibility.
* As we observe the system behavior, the time of the simulation can be compressed or expanded for a speed-up or a slow-down of the simulated process.
* Interaction between system variables can be observed.
* Importance of system variables on the performance of the system can be learned.
* Bottleneck analysis can be performed to discover which resource is delayed excessively.
* A simulation helps us to understand how the system operates rather than how individuals think the system operates.
* “what if” questions can be answered in the design of new systems.

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20th October, 2024, video 04, simulation modeling 04 disadvantages of simulation

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# Disadvantages of simulation

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