Stochastic Simulation
Simulation software

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Simulation languages

One way to understand/view/illustrate the importance of the field is through the abundance of commercially available simulation packages

- General purpose simulation langauges

  ◇ Arena - commercial

  ◇ Swarm - public domain - scientifically

  ◇ SAS - proc queuesim

- Dedicated software

  ◇ Vissim, Paramics, AIMSUN (Road traffic simulation)

  ◇ Opnet (Simulation of communication systems TCP/IP)

Desirable software features (from Law and Kelton)

- General capabilities (including modeling flexibility and ease of use)

- Hardware and software considerations

- Animation

- Statistical features

- Customer support and documentation

- Output reports and plots

General capabilities

- Modelling flexibility

- Ease of use

- Hierarchy

- Debugging aids

- Execution speed

- Possibility for constructing user-friendly "front ends"

- Data import

- Possibility for writing external routines

Hardware and software considerations

- What computer platforms the software is available for

- Compatible across platforms

- RAM required

- Supported operating systems

Animation

- Communicating the essence of a simulation model also to non-technical people

- Debugging

- Showing that a model is *not* valid

- Suggesting improved operational procedures for a system (triggering your powerful neural network!)

- Training operational personnel

- Promoting communication among the project team

Statistical capabilities

- Good random number generator(s)

- Standard probability distributions

  ◇ Normal, exponential, geometric, Poisson, gamma, Weibull, empirical, . . .

- Independent replications

- Automatic generation of confidence intervals

- Determine value of warmup period

Costumer support and documentation

- Public training (courses)

- Customized training

- Technical support

- Good documentation

Output report and graphics

- Standard reports

- Customized reports

- Histograms

- Time plots

General-purpose simulation packages

- Arena

- Extend

- GPSS

- Simula

- SWARM public domain GNU like product

- ⋮

Miscellaneous

- AMS - semiconductor planning

- Call Center MAESTRO - Call center work force staffing

- COMNET - Data communications, telecommunications, network design, network planning

- MIDSIM - Transportation, air traffic, military, logistics, telecommunications

Traffic simulation

- Vissim, Germany commercial

- Paramics, UK commercial

- Aimsun, Spain commercial

- MITSIM, MIT research

- many more . . .

Health

- MedModel

- Micro Saint