

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 languages
 - ◇ Arena - commercial
 - ◇ Enterprise Dynamics - commercial
 - ◇ SAS - Simulation Studio
- 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

- 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

Customer 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
- ⋮

Miscellaneous



- AMS - semiconductor planning
- Call Center SIMUL III - 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