

Tutorial 1

E-Business and Simulation

Sung Joo Park

(sjpark@kaist.ac.kr)

Graduate School of Management

Korea Advanced Institute of Science & Technology

Abstracts

Simulation has been evolved with the advance of computer and technique of modeling application systems. Early simulations were numerical analysis of engineering models known as continuous simulation, analysis of random events using various random number generators thus named as Monte Carlo simulation, and analysis of queues which are prevalent in many real world systems including manufacturing, transportation, telecommunication. Discrete-event simulation has been used for modeling and analyzing the systems with waiting lines and inefficient delays. These simulations, either discrete-event, continuous, or hybrid, have played a key role in industrial age by helping to design and implement the efficient real world systems.

In the information age which has been brought up by the advent of Internet, e-business has emerged. E-business, any business using Internet, can be characterized by the network of extended enterprises---extended supply and demand chains. The extension of value chains spans far reaching scope in business functions and space globally. It also extends to the individual customer, customer preferences and behaviors, to find the best service and product fit for each individual---mass customization. Simulation should also play a key role in analyzing and evaluating the various phenomena of e-business where the phenomena can be characterized by dynamics, uncertainty, and complexity.

In this tutorial, applications of simulation to e-business phenomena will be explained and illustrated. Examples are the dynamics of new economy, analysis of e-business processes, virtual manufacturing system, digital divide phenomena, etc. Partly influenced by e-business, a new trend of simulation has emerged called agent-based simulation. Agent-based simulation is a technique of simulation using software agent that have autonomy and proactivity which are useful in analyzing and integrating

numerous individual customer's behavior. One particular form of agent-based simulation is swarm. This tutorial concludes with the illustration of swarm or swarm intelligence applied to various e-business applications, and future directions and implications of this new trend of simulation.