PANEL ON
HYBRID SIMULATION/ANALYTIC MODELS AND MODELLING

PANEL CHAIRMAN: Robert G. Sargent
Department of Industrial Engineering and Operations Research
Syracuse University
Syracuse, NY 13210

PANELISTS: F. Tom Sparrow
School of Industrial Engineering
Potter 304
Purdue University
West Lafayette, IN 47907

J. G. Shanthikumar
Systems and Industrial Engineering
University of Arizona
Tucson, AZ 85721

William R. Lilegdon
Pritsker and Associates
P. O. Box 2413
West Lafayette, IN 47907

PANEL OBJECTIVE

The objective of this panel is to present a unifying view of hybrid simulation/analytic models and modelling and some specific examples for the purpose of encouraging research in and the use of hybrid models and modelling.

ABSTRACTS

Robert G. Sargent: A Unifying View

Unifying definitions for both hybrid simulation/analytic models and modelling will be given, four classes of hybrid simulation/analytic models presented, and four types of usages of hybrid simulation/analytic modelling discussed.

F. Tom Sparrow: Two Hybrid Simulation Models

Applications of hybrid simulation/optimization systems have been developed at Purdue University in recent months. One deals with imbedding within a mineral exploration simulation a mineral exploitation optimization module; the other deals with imbedding a steady state Markov chain optimization model in a simulation of the use of a shared fleet of automobiles. The characteristics of the problems dictate the way in which the imbedding was done; there are lessons to be learned as to the correct mix of optimization and simulation from each of these applications.

J.G. Shanthikumar: Hybrid Simulation/Analytic Models and Modelling of Dynamic Job Shops

We discuss the advantages and the necessity of using hybrid simulation/analytic models of pseudo-dynamic and hybrid simulation/analytic modelling of pseudo-static job shops. The applicability of these models for computer systems will also be discussed.

William R. Lilegdon: A Hybrid Model

A simulation of numerically controlled machining of aluminum sheet metal parts has been developed to aid the design of an integrated sheet metal manufacturing cell. The purpose of the simulation model is to examine alternative cell designs to increase cell productivity and reduce aluminum scrappage. Additionally, the use of zero-one programming to "optimize" the selection of orders is being examined. In this application, a zero-one algorithm is called by the simulation each time a decision is needed for release of orders to the manufacturing cell. The zero-one analysis will determine the extent to which zero-one programming can increase material utilization through "optimized" selection of orders.

The simulation study is being performed as part of Project 2108 "Integrated Sheet Metal Fabrication System" of the USAF Integrated Computer Aided Manufacturing (ICAM) Program. Project 2108 will design a state-of-the-art Integrated Fabrication system, build it on site at a major aerospace location, and track cost savings. The project goal is to develop technology which can reduce costs in the manufacture of aircraft for the USAF.

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