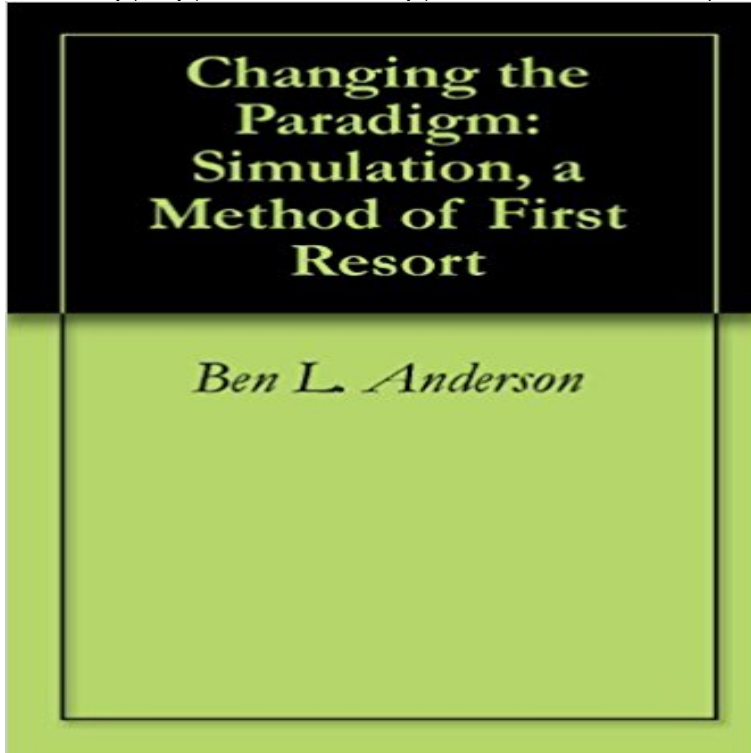


Changing the Paradigm: Simulation, a Method of First Resort



The computing capability to which Operations Research (OR) analysts have access today is over 1,000,000,000 times more powerful than the first simulation pioneers had sixty years ago, yet the concept that simulation is a method of last resort still plagues the OR community. Many real-world problems are complex, with properties such as high dimensionality, non-linear effects, stochastic elements, and dependence between variables. Solving these problems analytically often requires simplifying assumptions, running the risk of making a Type III error (i.e., getting the right answer to the wrong problem). This paper explores the development of computer simulation, and the key design principles that must be followed, to demonstrate how simulation is often the appropriate tool in understanding complex, real-world problems. Contrasting the results of a recently published analytical approach to the analysis of an airport check-in counter scheduling problem versus those of a simulation study of the same system, we demonstrate that simulation can quickly provide the same answers with any desired degree of precision and with no loss of insight. More importantly, simulation can easily use both empirical data and more realistic assumptions which allows for the analyst to address the right problem. With current computational capabilities and methods, it is time to change the paradigm. Simulation is a method of first resort.

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