

Simple Models for a Complex World (Lean Simulation)

*Stewart Robinson, Dean and Professor of Management Science,
School of Business and Economics, Loughborough University, UNITED KINGDOM*



Abstract

Simulation models provide simplified representations of the real world which are useful for understanding and predicting the future; but how simple should they be? In developing such models there is a tension between obtaining approximate results quickly from a simple model and making extended efforts to generate models with a high level of fidelity. In this talk I shall discuss why simple models can be better. In doing we shall see some examples of simulation models that have been applied by business and the health sector, showing how they were used and the benefits that were obtained. We shall also discuss how simple (Lean) simulation models can support a Lean approach.

SPEAKER BIOGRAPHY

Stewart Robinson is Dean and Professor of Management Science at Loughborough University, School of Business and Economics. Previously employed in simulation consultancy, he supported the use of simulation in companies throughout Europe and the rest of the world. He is author/co-author of six books on simulation. His research focuses on the practice of simulation model development and use. Key areas of interest are conceptual modelling, model validation, output analysis and alternative simulation methods (discrete-event, system dynamics and agent based). Professor Robinson is co-founder of the Journal of Simulation and the UK Simulation Workshop conference series. He was President of the Operational Research Society (2014-2015). Home page: www.stewartrobinson.co.uk. Email: s.l.robinson@lboro.ac.uk

Large-Scale Optimization for Real-World Applications

*Kalyanmoy Deb, Koenig Endowed Chair Professor,
Michigan State University, East Lansing, USA*



Abstract

Optimization problems are omni-present, but real-world problems involve several complexities including a large dimension of variables, objectives, and constraints. Most optimization algorithms suffer from the "curse of dimensionality", but recent population-based algorithms are flexible enough to be customized to find near-optimal solutions quickly. As a result, they are being increasingly applied to societal, scientific, and industrial domains. In this talk, we shall present at least two case studies -- a single-objective industrial resource allocation problem involving a billion of variables and a many-objective societal land use management problem involving 14 objectives and an astronomically large search space -- to demonstrate the recent developments of large scale applications of optimization methods.

Bio-Sketch of the Speaker:

Kalyanmoy Deb is Koenig Endowed Chair Professor at Department of Electrical and Computer Engineering in Michigan State University. Prof. Deb's research interests are in evolutionary optimization and their application in multi-criterion optimization, modeling, and machine learning. He has been a visiting professor at various universities across the world including IITs in India, University of Skovde in Sweden, Aalto University in Finland, and Nanyang Technological University in Singapore. He received Infosys Prize, TWAS Prize in Engineering Sciences, CajAstur Mamdani Prize, Edgeworth-Pareto award, Bhatnagar Prize in Engineering Sciences, and Bessel Research award from Germany. He is fellow of IEEE and ASME. He has published over 510 research papers with Google Scholar citation of over 129,000 with h-index 113. He is in the editorial board on 18 major international journals. More information about his research contribution can be found from <http://www.coin-laboratory.com>.