Hybrid Simulation and Hybrid Systems Modelling Approach

Modelling and Simulation (M&S) is a tool for decision making; it allows stakeholders to build computer models of existing or proposed systems of interest and develop scenarios for experimentation. The capability to ‘experiment’ prior to ‘implementation’ enables stakeholders to make better and more informed decisions. There are several M&S techniques, e.g., discrete-event simulation, agent-based simulation, system dynamics and Monte Carlo. Traditionally, these techniques have been used in isolation. However, of late, an increasing number of studies advocate the use of multiple simulation techniques to define the system under scrutiny - this is also referred to as Hybrid Simulation (HS). HS can be extended further to include simulation studies that apply interdisciplinary methods and techniques from disciplines like Applied Computing, Economics and Operations Research – this is referred to as Hybrid Systems Modelling Approach (HSMA). In this talk several examples will be provided to show the progression of M&S studies from the traditional one-technique approach, to the present focus on using multiple techniques (HS), and, looking to the future, the need for HSMA and the opportunity it holds for extending M&S methodology.