The Computer Experiment in Computational Social Science

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The year 2003 was the 50th anniversary of the invention of the "computer experiment" by Fermi, Pasta and Ulam. The computer experiment was offered as the third way of doing science at the time. In Kuhn's normal science, the scientific method suggests the generation of new knowledge by making observations of a phenomenon, identifying curious aspects of the phenomenon, generating a falsifiable hypothesis to explain the phenomenon, and designing an experiment to disprove the hypothesis (Popper 1982). Should the experiment fail (to disprove the hypothesis) it is accepted as an explanatory model until eventually replaced by something better. Fermi et al proposed the use of the computer experiment for inquiry into the physical sciences where the phenomenon cannot or is not easily observed. Over the last decade various social science disciplines, including political science, anthropology, sociology, and organizational science began to embrace simulation as one method of inquiry in what is sometimes called computation social science. Recently, Axelrod (1997), McKelvey (1999), Goldspink (2002), Kluver et al (2003) and many others have explored the role of computer simulation as a source of new knowledge in the social sciences. We integrate their analysis and present another view of computer simulation as part of the classical scientific method applied to the investigation of social systems. The hypothesis of the classical scientific method becomes the conceptual model of the social scientists, which in turn is implemented in a computer simulation. Computer experiments are conducted using those computer simulations.