Antrittsvorlesung des Leibniz-Professors der Universität Leipzig im Sommersemester 2005

The Computer Revolution and Computer Simulations

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Abstract:

The computer revolution is driven by a sustained increase of computational speed by approximately one order of magnitude (a factor of ten) every five years since about 1950. The by the year 2005 resulting factor of 10^{11} has changed our daily lives at the workplace as well as at home. In science computer simulations have gained in importance relative to traditional analytical approaches.

In the talk I will first summarize the basic features of modern computers and then give an overview of (subjectively picked) simulation methods and results. Topics will touch cellular automata, random numbers, the statistical bootstrap with an application in Social Sciences, and Markov Chain Monte Carlo simulations. Further applications ranging from Particle over Statistical Physics to Structural Biology will be discussed.