

Simulating Many-Body Models in Physics: Rigorous Results, 'Benchmarks', and Cross-Model Justification

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Abstract

This paper argues that, for a prospective philosophical analysis of models and simulations to be successful, it must accommodate an account of mathematically rigorous results. Such rigorous results are best thought of as genuinely model-specific contributions, which can neither be deduced from fundamental theory nor inferred from empirical data. Rigorous results often provide new indirect ways of assessing the success of computer simulations of individual models. This is most obvious in cases where rigorous results map different models on to one another. Not only does this allow for the transfer of warrant across different models, it also puts constraints on the extent to which performance in specific empirical contexts may be regarded as the main touchstone of success in scientific modelling. Rigorous results and relations can thus come to be seen as giving cohesion and stability to actual practices of scientific modelling.

Keywords: models, model, rigor, rigour, mathematical physics, simulations, modelling

Subjects:

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Conferences and Volumes: [\(Models and Simulations, London, 2006\)](#)

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