

Search & Browse

- Simple Search
- Advanced Search
- Browse by Subject
- Browse by Year
- Browse by Conferences/Volumes
- Latest Additions

Information

- Home
- About the Archive
- Archive Policy
- History
- Help
- FAQ
- Journal Eprint Policies
- Register
- Contact Us

News

- Guide to new PhilSci-Archive features.

Mathematical Models in Newton' s Principia: A New View of the " Newtonian Style"

Ducheyne, Steffen (2005) *Mathematical Models in Newton' s Principia: A New View of the " Newtonian Style"* . [Preprint]



PDF
[Download \(376Kb\)](#) | [Preview](#)

Abstract

In this essay I argue against Bernard I. Cohen' s influential account of Newton' s methodology in the Principia: the " Newtonian Style" . The crux of Cohen' s account is the successive adaptation of " mental constructs" through comparisons with nature. In Cohen' s view there is a direct dynamics between the mental constructs and physical systems. I argue that his account is essentially hypothetical-deductive which is at odds with Newton' s rejection of the hypothetical-deductive method. An adequate account of Newton' s methodology needs to show how Newton' s method proceeds different from the hypotheticaldeductive method. In the constructive part I argue for my own account which is model-based: it focuses on how Newton constructed his models in Book I of the Principia. I will show that Newton understood Book I as an exercise in determining the mathematical consequences of certain force functions. The growing complexity of Newton' s models is a result of exploring increasingly complex force functions (intra-theoretical dynamics) rather than a successive comparison with nature (extra-theoretical dynamics). Nature did not enter the scene here. This intra-theoretical dynamics is related to the " autonomy of the models" .

Export/Citation: [EndNote](#) | [BibTeX](#) | [Dublin Core](#) | [ASCII \(Chicago style\)](#) | [HTML Citation](#) | [OpenURL](#)
Social Networking: [Share](#) |

Item Type: Preprint

Additional Information: This version will appear in International Studies in the Philosophy of Science.

Keywords: Isaac Newton; Principia; (hypothetical-deductive) methodology; I. Bernard Cohen; Newtonian Style; models; models as mediators

Subjects: [Specific Sciences > Physics > Classical Physics](#)
[General Issues > Structure of Theories](#)
[General Issues > Models and Idealization](#)
[General Issues > History of Philosophy of Science](#)
[General Issues > Laws of Nature](#)
[General Issues > Theory/Observation](#)
[General Issues > Explanation](#)
[General Issues > History of Science Case Studies](#)

Depositing User: [Steffen Ducheyne](#)

Date Deposited: 15 Jan 2005

Last Modified: 07 Oct 2010 11:13

Item ID: 2155

URI: <http://philsci-archive.pitt.edu/id/eprint/2155>

Actions (login required)



View Item

Document Downloads



This site is hosted by the [University Library System](#) of the [University of Pittsburgh](#) as part of its [D-Scribe Digital Publishing Program](#)



Philsci Archive is powered by [EPrints 3](#) which is developed by the [School of Electronics and Computer Science](#) at the University of Southampton. [More information and software credits.](#)



Atom



RSS 1.0



RSS 2.0