Advance in Monte Carlo Simulations and Robustness Study and their Implications to the dispute in Philosophy of Mathematics

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Abstract

Both Carnap and Quine made significant contributions to the philosophy of mathematics despite their diversed views. Carnap endorsed the dichotomy between analytic and synthetic knowledge and classified certain mathematical questions as internal questions appealing to logic and convention. On the contrary, Quine was opposed to the analytic-synthetic distinction and promoted a holistic view of scientific inquiry. The purpose of this paper is to argue that in light of the recent advancement of experimental mathematics such as Monte Carlo simulations, limiting mathematical inquiry to the domain of logic is unjustified. Robustness studies implemented in Monte Carlo Studies demonstrate that mathematics is on par with other experimental-based sciences.