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THE ROLE OF MATHEMATICS IN EVOLUTIONARY THEORY

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The Role of Mathematics in Evolutionary Theory

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Abstract: The central role of mathematical modeling in modern evolutionary theory has raised a concern as to why and how abstract formulae can say anything about empirical phenomena of evolution. This Element introduces existing philosophical approaches to this problem and proposes a new account according to which evolutionary models are based on causal, and not just mathematical, assumptions. The novel account features causal models both as the Humean “uniform nature” underlying evolutionary induction and as the organizing framework that integrates mathematical and empirical assumptions into a cohesive network of beliefs that functions together to achieve epistemic goals of evolutionary biology.

Keywords: evolutionary theory, causal modelling, fitness, mathematical explanation, population genetics

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