

# Justifying Definitions in Mathematics—Going Beyond Lakatos

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## Abstract

This paper addresses the actual practice of justifying definitions in mathematics. First, I introduce the main account of this issue, namely Lakatos's proof-generated definitions. Based on a case study of definitions of randomness in ergodic theory, I identify three other common ways of justifying definitions: natural-world-justification, condition-justification and redundancy-justification. Also, I clarify the interrelationships between the different kinds of justification. Finally, I point out how Lakatos's ideas are limited: they fail to show that various kinds of justification can be found and can be reasonable, and they fail to acknowledge the interplay between the different kinds of justification.

**Keywords:** definitions in mathematics, justification of definitions, Lakatos, mathematical reasoning, chaos, dynamical systems theory, ergodic theory

[Specific Sciences: Physics: Classical Physics](#)

[Specific Sciences: Complex Systems](#)

**Subjects:** [Specific Sciences: Probability/Statistics](#)

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