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History of Mathematical Economics

Thind K*

Editorial, Statistics and Mathematics, India

Editorial

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***For Correspondence**

Komal Thind, Editorial, Statistics and Mathematics, India

E-mail: mathematicsstat@scholarlymed.com

EDITORIAL

Mathematical economics is a theoretical and operational study whose goal is to describe economic objects, events, and occurrences quantitatively. The Keynesian and Marginal revolutions gave birth to modern economics. Basic methods and techniques in economic theory emerged as a result of these revolutions, allowing the use of differential and integral calculus to explain economic occurrences, consequences, and activities. In economics, the explanation of economic operations must account for the fact that economic agents' conduct may be influenced by the history of earlier economic developments. The majority of economic theories are given as economic models. The features of these models are examined in mathematical economics using formalizations of economic ideas and conceptions. Theorems on the presence of high values of particular variables are established in mathematical economics, and features of equilibrium situations and equilibrium development trajectories are explored, among other things.

The most essential goal is to describe economic notions and theories in a mathematical form that is theoretically adequate and self-consistent and to build mathematical models of economic processes and phenomena on the foundation of these representations. Furthermore, proving the existence of solutions and locating it in analytic or numerical form is insufficient; an economic interpretation of the established mathematical conclusions is required.

We might say that the application of differential (and integral) calculus to understand and analyze economic phenomena ushered in contemporary quantitative economics in the nineteenth century. The modern economic theory arose virtually simultaneously with the advent of new economic concepts that were actively exploited in diverse economic frameworks. Such mathematical techniques enabled economists to create mathematical economic models that could be used to represent a wide variety of economic processes and phenomena. Nevertheless, these instruments have a variety of flaws that cause representations of economic activities to be inadequate. In reality, such equations only represent economic processes if all economic agents have total amnesia and only engage with their immediate neighbors. This assumption concerning economic agents' lack of memory is a significant constraint for economic models. As a result, there are flaws in these simulations. The real era (the "Memory revolution") aims to incorporate diverse processes with huge reputation and non-locality into the contemporary economic concept and mathematical finance. The science of non-integer scale derivatives and integrals (fractional calculus), fractional differential, and difference formulas are the key mathematical tools used to "cure amnesia" in finance. The concept of fractional dynamic indicators of social events, occurrences, and impacts is known as fractional mathematical economics. Fractional calculus approaches are being established in this context of mathematical economics for use in economics and finance issues.

A schematic description of the growth of fractional calculus operations in economics, the emergence of a new direction in mathematical economics, and a fresh breakthrough in economics were attempted in this concise historical record. Because of its length and conceptual nature, this illustration does not capture the full breadth and complexity of the evolution of fractional mathematical economics. As a consequence, it's probable that certain key orientations and methods, as well as findings and works from earlier in the past, were overlooked. One might hope that the described brief background will be understood and that more works on the history of the application of fractional calculus in economics will be published in the upcoming.