Harnessing Mathematical and Computational Modeling: Methods and Real-World Applications

Мойсеенок Н.С., ст. преподаватель,

Житников И.А., студент,

БГУ, г. Минск, Беларусь

Abstract. Mathematical and computational modeling are powerful tools used in various fields of science and technology. Modeling helps analyze, predict, and optimize systems, which is particularly important in today's rapidly changing world. This paper discusses the main methods of mathematical and computational modeling, as well as examples of their application to real-world problems.

Key words: modeling, numerical methods, algorithms, optimization, prediction, technologies, systems, computation.

Автор: Мойсеенок Н.С.,Житников И.А.
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Mathematical and computational modeling are powerful tools used in various fields of science and technology. Modeling helps analyze, predict, and optimize systems, which is particularly important in today's rapidly changing world. This paper aims to highlight the fundamental methods of mathematical and computational modeling and demonstrate their application in solving real-world challenges.

Modeling plays a significant role in scientific research and engineering tasks. Mathematical modeling allows the creation of theoretical descriptions of complex systems, while computational modeling enables practical computation and analysis. The main objective of this paper is to examine the key methods of modeling and provide examples of their application to real-world problems [2, p.59].

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