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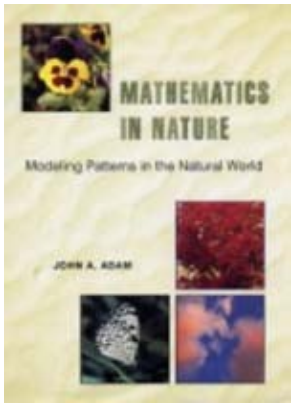
Reviews

'Mathematics in nature'

reviewed by Cristina Escoda



Mathematics in nature: Modeling patterns in the natural world

by John A. Adam

Have you ever wondered how high a flea of the size of a human could jump, why rivers meander or how high a tree can grow? *Mathematics in Nature* provides answers to all these questions and many more, while introducing the reader to the ideas and methods of mathematical modelling.

John Adam is an enthusiastic and clear writer, and manages to explain in an informal way the "symbiosis that exists between the basic scientific principles involved in natural phenomena and their mathematical descripton". He presents the various phenomena at different levels of description, from the fundamental power of estimation or the effects of scale, to more sophisticated concepts, such as the connection between the Fibonacci sequence and the branching patterns of trees.

The book starts with the most fundamental tools behind mathematical modelling, and with each chapter progresses to more advanced material. A very complete first chapter presents the philosophy and art of modelling patterns in nature. The author introduces us to the Fermi problem and scales, and in the following chapters he explains phenomena such as clouds, sand dunes and hurricanes, waves, river meanders, bird flight

and spot patterns in animals.

Developed out of a university course, the book is a nice combination of textbook for undergraduate students studying modelling patterns and popular science book on mathematics in nature. Adams manages to defer the introduction of equations until later on in each chapter, giving the general reader a deep explanation for each phenomenon before progressing to the mathematical formulation. All the same, this is a book of mathematics and equations do eventually appear, sometimes at an advanced level.

Each chapter is independent from each other, which makes "Mathematics in Nature" the perfect book to have at hand on those days we feel curious and puzzled by the the natural world we live in. It would also make a useful complementary text for courses in applied mathematics and mathematical modelling. Enthusiasts at all levels will find it a source of fresh and inspiring material.

As well as nice pictures and numerous examples from everyday life, there is an exhaustive list of suggestions for further reading in the bibliography.

Book details:

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John A. Adam
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About the reviewer

Cristina Escoda is a second year Phd student at the University of Cambridge working on the phenomenology of String Theory and Supersymmetry. Cristina is an enthusiastic writer and very interested in science communication.