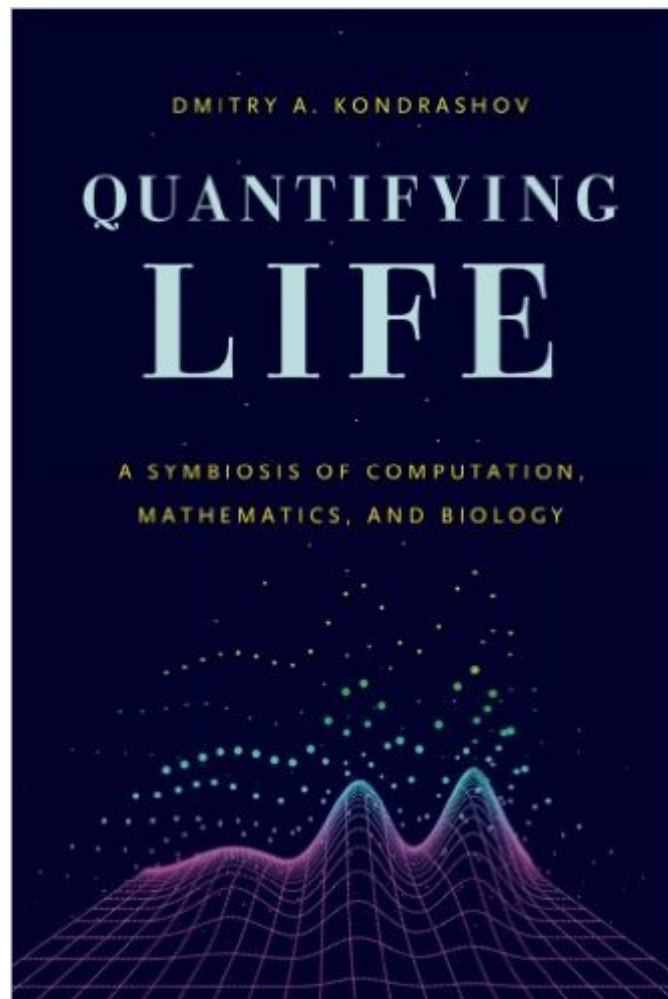# Quantifying Life: A Symbiosis Of Computation, Mathematics, And Biology

Synopsis

Since the time of Isaac Newton, physicists have used mathematics to describe the behavior of matter of all sizes, from subatomic particles to galaxies. In the past three decades, as advances in molecular biology have produced an avalanche of data, computational and mathematical techniques have also become necessary tools in the arsenal of biologists. But while quantitative approaches are now providing fundamental insights into biological systems, the college curriculum for biologists has not caught up, and most biology majors are never exposed to the computational and probabilistic mathematical approaches that dominate in biological research. With Quantifying Life, Dmitry A. Kondrashov offers an accessible introduction to the breadth of mathematical modeling used in biology today. Assuming only a foundation in high school mathematics, Quantifying Life takes an innovative computational approach to developing mathematical skills and intuition. Through lessons illustrated with copious examples, mathematical and programming exercises, literature discussion questions, and computational projects of various degrees of difficulty, students build and analyze models based on current research papers and learn to implement them in the R programming language. This interplay of mathematical ideas, systematically developed programming skills, and a broad selection of biological research topics makes Quantifying Life an invaluable guide for seasoned life scientists and the next generation of biologists alike.

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