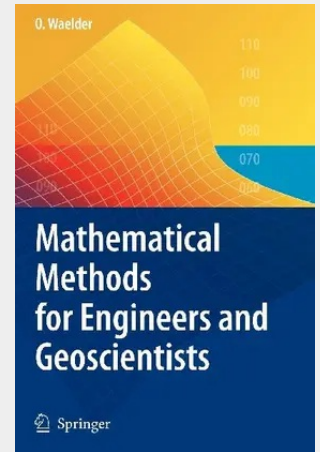


Mathematical Methods for Engineers and Geoscientists

This fascinating work makes the link between the rarified world of maths and the down-to-earth one inhabited by engineers. It introduces and explains classical and modern mathematical procedures as applied to the real problems confronting engineers and geoscientists. Written in a manner that is understandable for students across the breadth of their studies, it lays out the foundations for mastering difficult and sometimes confusing mathematical methods. Arithmetic examples and figures fully support this approach, while all important mathematical techniques are detailed. Derived from the author's long experience teaching courses in applied mathematics, it is based on the lectures, exercises and lessons she has used in her classes. Also, the explanations and discussions in the book are inspired by the most frequently-asked questions of students, graduates and professionals.

We start with a fun puzzle in mathematics and mathematical methods. How many corners does a four-dimensional cube have? Does such a thing exist, you ask? You may be a geoscientist or a philosopher. If your answer is: there are surely more than the eight corners there are for a three-dimensional cube, you are an engineer. If you know without hesitation that there are exactly sixteen corners and you can prove why, you are a mathematician. To explain the goal of this book, I refer to Hersh (1997): The United States suffers from *innumeracy* in its general population, *math avoidance* among high-school students, and 50 percent failure among college calculus students. Causes include starvation budgets in the school, mental attrition by television, parents who don't like math. There's another, unrecognized cause of failure: misconception of the nature of mathematics. I think the specific reference to the United States may be omitted. It is really a worldwide problem. Moreover, there is one more consequence of *math avoidance* and *misconception*: good mathematical approaches are sometimes applied incorrectly. Particularly, the methods of statistics are often misused for different goals. Applying mathematical methods is similar to using nuclear power: the final results depend on the competence of the user. I try to convince my readers to apply the *energy* of mathematics with consideration.



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