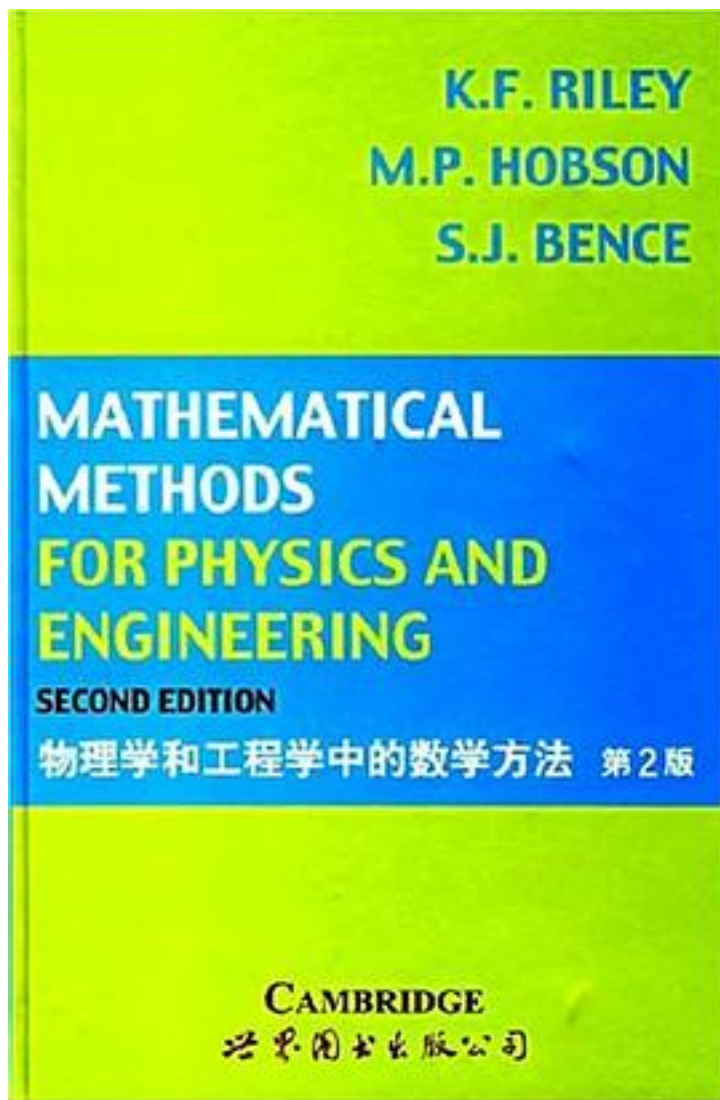


# 物理学和工程学中的数学方法



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Since the publication of the first edition of this book, both through teaching the material it covers and as a result of receiving helpful comments from colleagues, we have become aware of the desirability of changes in a number of areas. The most important of these is that the mathematical preparation of current senior college and university entrants is now less thorough than it used to be. To match this, we decided to include a preliminary chapter covering areas such as polynomial equations, trigonometric identities, coordinate geometry, partial fractions, binomial expansions, necessary and sufficient condition and proof by induction and contradiction.

作者介绍:

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preface to the first edition

1 preliminary algebra

1.1 simple functions and equations

polynomial equations; factorisation; properties of roots

1.2 trigonometric identities

single angle; compound-angles; double- and half-angle identities

1.3 coordinate geometry

1.4 partial fractions

complications and special cases

1.5 binomial expansion

1.6 properties of binomial coefficients

1.7 some particular methods of proof

proof by induction; proof by contradiction; necessary and sufficient conditions

1.8 exercises

1.9 hints and answers

2 preliminary calculus

2.1 differentiation

differentiation from first principles: products; the chain rule; quotients; implicit

differentiation; logarithmic differentiation; leibnitz' theorem; special points of a

function: curvature: theorems of differentiation

2.2 integration

.integration from first principles; the inverse of differentiation; by inspection; sinusoidal

functions; logarithmic integration; using partial fractions; substitution method;

integration by parts; reduction formulae; infinite and improper integrals; plane polar

coordinates; integral inequalities; applications of integration

2.3 exercises

2.4 hints and answers

3 complex numbers and hyperbolic functions

3.1 the need for complex numbers

3.2 manipulation of complex numbers

addition and subtraction; modulus and argument; multiplication; complex conjugate; division

3.3 polar representation of complex numbers multiplication and division in polar form

3.4 de moivre's theorem

trigonometric identities; finding the  $n$ th roots of unity: solving polynomial equations

3.5 complex logarithms and complex powers

3.6 applications to differentiation and integration

3.7 hyperbolic functions

definitions; hyperbolic-trigonometric analogies; identities of hyperbolic functions:

solving hyperbolic equations; inverses of hyperbolic functions; calculus of hyperbolic

functions

3.8 exercises

3.9 hints and answers

4 series and limits

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4.2 summation of series

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4.3 convergence of infinite series

absolute and conditional convergence; series containing only real positive terms; alternating series test

4.4 operations with series

4.5 power series

convergence of power series; operations with power series

4.6 Taylor series

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5.9 stationary values under constraints

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6.2 triple integrals

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6.4 change of variables in multiple integrals

change of variables in double integrals; evaluation of the integral  $\iint$  = change of variables in triple integrals; general properties of Jacobians

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7.3 multiplication by a scalar

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## 评论

此书几乎是把整个大学所需的数学集合在一起，而不是传统的数理方法教材。在这一点上，我还是觉得读专门教材更划算一些。

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