

## <<多元微积分>>

### 图书基本信息

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## <<多元微积分>>

### 内容概要

《多元微积分(第3版)》是全面, 知识体系新颖的多变量微积分教程。旨在解决广大多变量微积分学者遇到的新老问题, 包内包括: (第一部分) 基础资料: 向量; 向量微分; 多变量函数; 链式法则和梯度; (第二部分) 最大值, 最小值和泰勒公式: 最大值和最小值; 高阶导数; (第三部分) 曲线积分和双积分: 势函数; 曲线积分; 双积分; 格林定理; (第四部分) 三重积分和曲面积分: 三重积分; 曲面积分; (第五部分) 映射、反映射和变量变换公式: 矩阵; 线性映射; 行列式; 多变量函数的应用; 变量变换公式; 附录: 傅里叶级数。

读者对象: 数学专业的本科生、研究生和相关专业的数学工作者。

## &lt;&lt;多元微积分&gt;&gt;

## 书籍目录

## part one basic material

## chapter i vectors

1. definition of points in space
2. located vectors
3. scalar product
4. the norm of a vector
5. parametric lines
6. planes
7. the cross product

## chapter ii differentiation of vectors

1. derivative
2. length of curves

## chapter iii functions of several variables

1. graphs and level curves
2. partial derivatives
3. differentiability and gradient
4. repeated partial derivatives

## chapter iv the chain rule and the gradient

1. the chain rule
2. tangent plane
3. directional derivative
4. functions depending only on the distance from the origin
5. the law of conservation of energy
6. further technique in partial differentiation

## part two maxima, minima, and taylor's formula

## chapter v maximum and minimum

1. critical points
2. boundary points
3. lagrange multipliers

## chapter vi higher derivatives

1. the first two terms in taylor's formula
  2. the quadratic term at critical points
  3. algebraic study of a quadratic form
  4. partial differential operators
  5. the general expression for taylor's formula
- appendix. taylor's formula in one variable

note. chapter ix on double integrals is self contained, and could

be covered here.

## part three curve integrals and double integrals

## chapter vii potential functions

1. existence and uniqueness of potential functions
2. local existence of potential functions
3. an important special vector field
4. differentiating under the integral
5. proof of the local existence theorem

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### chapter viii curve integrals

1. definition and evaluation of curve integrals
2. the reverse path
3. curve integrals when the vector field has a potential

### function

4. dependence of the integral on the path

### chapter ix double integrals

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2. repeated integrals
3. polar coordinates

### chapter x green's theorem

1. the standard version
2. the divergence and the rotation of a vector field

### part four triple and surface integrals

#### chapter xi triple integrals

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2. cylindrical and spherical coordinates
3. center of mass

#### chapter xii surface integrals

1. parametrization, tangent plane, and normal vector
2. surface area
3. surface integrals
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5. divergence theorem in 3-space
6. stokes' theorem

### part five mappings, inverse mappings, and change of variables

#### formula

#### chapter xiii matrices

1. matrices
2. multiplication of matrices

#### chapter xiv linear mappings

1. mappings
2. linear mappings
3. geometric applications
4. composition and inverse of mappings

#### chapter xv determinants

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2. determinants of order 3
3. additional properties of determinants
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5. determinant of a product
6. inverse of a matrix

#### chapter xvi applications to functions of several variables

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2. differentiability
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5. implicit functions

6. the hessian

chapter xvii the change of variables formula

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2. dilations

3. change of variables formula in two dimensions

4. application of green's formula to the change of variables

formula

5. change of variables formula in three dimensions

6. vector fields on the sphere

appendix fourier series

1. general scalar products

2. computation of fourier series

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