

## <<成像中的变分法>>

### 图书基本信息

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### 内容概要

本书致力于研究成像处理中的方法，本着数学的严谨，用逆问题的观点研究这个科目。更重要的，本书从确定性、几何和随机的观点研究变分法，架起了成像分析中规范理论和逆问题的桥梁，图形分析中的案例来解释变分法，如去噪、热声学、计算断层照相法中的应用，讨论了非凸变量微积分、形态学分析和水平集之间的联系。

分析变分法包括变分法的经典分析、现代分析如G规范性质和非凸变量分析，运用数值例子提高学习这本书的研究生和应用数学的研究人员理论水平。

本书可以作为成像处理及和逆过程课程的一本很好的研究生水平的教程，也可以是学习规范理论的补充教程。

成像处理领域的计算机专家也会从这本书中受益。

目次：（一）成像基础：成像案例；成像和噪音模型；（二）正规化：逆问题解的变分规范化方法；降噪中的凸规范化方法；非凸正规化的变量微积分；半群理论和尺度空间；逆尺度空间；（三）数学基础：泛函分析；若微分函数；凸分析和变量微积分。

读者对象：数学专业、计算机专业的本科生、研究生和相关的科研人员。

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## 章节摘录

版权页：插图： In this case, the function  $p_A$  is called the probability density of  $A$ . Assume that  $\Omega$  is a sampling space with probability distribution  $P$ . An  $n$ -dimensional random vector  $X = (X_1, \dots, X_n)$  is a measurable function  $X: \Omega \rightarrow \mathbb{R}^n$ . The joint probability  $P_X$  of  $X$  is the measure on  $\mathbb{R}^n$  defined by  $P_X(A) := P(X^{-1}(A))$ ,  $A \in \mathcal{B}(\mathbb{R}^n)$  measurable. The probability density of a random vector  $X$  is defined analogously to the probability density of a random variable. If  $X$  is an  $n$ -dimensional random vector on  $\Omega$ , then its components  $X_i, 1 \leq i \leq n$ , are themselves random variables on  $\Omega$ . We say that the random vector  $X$  consists of independent random variables  $X_i$ , if  $P_X(A_1 \times \dots \times A_n) = P_{X_1}(A_1) \dots P_{X_n}(A_n)$ ,  $A_1, \dots, A_n \in \mathcal{B}(\mathbb{R})$  measurable, where  $P_{X_i}$  are the probability distributions of  $X_i, 1 \leq i \leq n$ . If additionally  $P_{X_i} = P_{X_j}$  for all  $1 \leq i, j \leq n$ , then  $X$  consists of independent and identically distributed, in short i.i.d., random variables.

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