# <<Information Theory &>>

## 图书基本信息

书名：<<Information Theory & Coding信息论与编码>>

13位ISBN编号：9787508455693

10位ISBN编号：750845569X

出版时间：2008-7

出版时间：水利水电出版社

作者：梁建武 等编著

页数：196

# <<Information Theory &>>

## 内容概要

本书重点介绍经典信息论的基本理论，并力图将信息论的基本理论和工程应用的编码理论联系起来，介绍一些关于这些理论的实际应用。
全书分为7章，内容包括信息度量的基本理论、无失真信源编码、限失真信源编码、信道编码及其应用等。

本书注重基本概念，并且用通俗易懂的语言对它们加以诠释。
在当前信息、通信系统飞速发展的大背景下，本书力图用较多的例子和图表来阐述概念和理论，同时尽量避免纠缠于烦琐难懂的公式证明之中。
为了加深读者对所讲述知识的理解，每章最后都配有适量的练习。
题供读者选用。

本书可作为高等院校电子信息类学生双语教学的教材或参考书，也可作为通信、电信、电子等领域从业人员的参考资料。

## 作者简介

梁建武，中南大学教师。
合编著有《网页制作与设计实训》等。

# <<Information Theory &>>

## 书籍目录

Chapter 1 Introduction Contents Before it starts, there is something must be known 1.1 What is Information 1.2 What ’s Information Theory ?
1.2.1 Origin and Development of Information Theory 1.2.2 The application and achievement of Information Theory methods 1.3 Formation and Development of Information Theory Questions and Exercises Biography of Claude Elwood ShannonChapter 2 Basic Concepts of Information Theory Contents Preparation knowledge 2.1 Self-information and conditional self-information 2.1.1 Self-Information 2.1.2 Conditional Self-Information 2.2 Mutual information and conditional mutual information 2.3 Source entropy 2.3.1 Introduction of entropy 2.3.2 Mathematics description of source entropy 2.3.3 Conditional entropy 2.3.4 Union entropy （Communal entropy） 2.3.5 Basic nature and theorem of source entropy 2.4 Average mutual information 2.4.1 Definition 2.4.2 Physics significance of average mutual information 2.4.3 Properties of average mutual information 2.5 Continuous source 2.5.1 Entropy of the continuous source （also called differential entropy） 2.5.2 Mutual information of the continuous random variable Questions and Exercises Additional reading materialsChapter 3 Discrete Source Information Contents 3.1 Mathematical model and classification of the source 3.2 The discrete source without memory 3.3 Multi-marks discrete steady source 3.4 Source entropy of discrete 4.2.4 Relationship between entropy, channel doubt degree and mutual information 4.3 The discrete channel without memory and its channel capacity 4.4 Channel capacity 4.4.1 Concept of channel capacity 4.4.2 Discrete channel without memory and its channel capacity 4.4.3 Continuous channel and its channel capacity Chapter 5 kossless source coding Contents 5.1 Lossless coder 5.2 Lossless source coding 5.2.1 Fixed length coding theorem 5.2.2 Unfixed length source coding 5.3 Lossless source coding theorems 5.3.1 Classification of code and main coding method 5.3.2 Kraft theorem 5.3.3 Lossless unfixed source coding theorem （Shannon First theorem） 5.4 Pragmatic examples of lossless source coding 5.4.1 Huffman coding 5.4.2 Shannon coding and Fano coding 5.5 The Lempel-ziv algorithm 5.6 Run-Length Encoding and the PCX format Questions and ExercisesChapter 6 Limited distortion source coding Contents 6.1 The start point of limit distortion theory 6.2 Distortion measurement 6.2.1 Distortion function 6.2.2 Average distortion 6.3 Information rate distortion function 6.4 Property of R （D） 6.4.1 Minimum of D and R （D） 6.4.2 Dmax and R （Dmax） 6.4.3 The under convex function of R （D） 6.4.4 Questions and exercisesBibliography

## 章节摘录

Before it starts, there is something must be known First, the main content will show those： how to measure the information, this question can be answered after the way of Shannon measures information is understood. As a student of communication engineering, the concepts such as information source and channel , have been contracted with before. The distortionless way of coding for source and channel are included in the Shannons first theorem, Shannons second theorem and third theorem which will be shown later. In addition, many examples for the applications of Information Theory will be involved in the course of this study. Second , the importance of studying the Information Theory also needs to be emphasized. The Information Theory is the elementary theory of Information Science and Technology. Without the foundation of Information Theory, one cannot be engaged in the communication domain research and innovation, nor can he touch the edge of this field. In brief, the Information Theory is the essential elementary knowledge to master for one who has high level information technology. The course of Fundamental Information Theory is the foundation curriculum for communication and the information field. Only when it is mastered, can it learn the succeeding curriculum and occupy in the scientific research and the innovation in the information field. So, cherish this study opportunity, study hard to raise the scientific research abilities gradually and set up the consummated personality foundation, thus to lay solid foundation for further study and scientific research.

## 版权说明