

# CONTENTS

<b>Preface</b>	<b>vii</b>
<b>Chapter I. Entropy</b>	<b>1</b>
1.1. The Shannon entropy .....	1
1.2. Conditional expectations .....	11
1.3. The Kolmogorov-Sinai entropy .....	16
1.4. Algebraic models .....	29
1.5. Entropy functionals .....	41
1.6. Relative entropy and Kullback-Leibler information .....	49
Bibliographical notes .....	<b>63</b>
<b>Chapter II. Information Sources</b>	<b>67</b>
2.1. Alphabet message spaces and information sources .....	67
2.2. Ergodic theorems .....	71
2.3. Ergodic and mixing properties .....	75
<b>2.4.</b> AMS sources .....	91
2.5. Shannon-McMillan-Breiman theorem .....	99
2.6. Ergodic decompositions .....	106
2.7. Entropy functionals, revisited .....	110
Bibliographical notes .....	119
<b>Chapter III. Information Channels</b>	<b>121</b>
3.1. Information channels .....	121
3.2. Channel operators .....	129
3.3. Mixing channels .....	136
3.4. Ergodic channels .....	147
3.5. AMS channels .....	156
3.6. Capacity and transmission rate .....	166
3.7. Coding theorems .....	178
Bibliographical notes .....	187
<b>Chapter IV. Special Topics</b>	<b>189</b>
4.1. Channels with a noise source .....	189

4.2. Measurability of a channel .....	196
4.3. Approximation of channels .....	202
4.4. Harmonic analysis for channels .....	207
4.5. Noncommutative channels .....	214
Bibliographical notes .....	222
<b>References</b>	<b>225</b>
<b>Indices</b>	<b>239</b>
Notation index .....	239
Author index .....	244
Subject index .....	247