Contents

Par	t I	A Guided Tour to Arbitrage Theory	
1	The	Story in a Nutshell	3
	1.1	Arbitrage	3
	1.2	An Easy Model of a Financial Market	4
	1.3	Pricing by No-Arbitrage	5
	1.4	Variations of the Example	7
	1.5	Martingale Measures	7
	1.6	The Fundamental Theorem of Asset Pricing	8
2	Mod	lels of Financial Markets on Finite Probability Spaces .	11
	2.1	Description of the Model	11
	2.2	No-Arbitrage and the Fundamental Theorem of Asset Pricing .	16
	2.3	Equivalence of Single-period with Multiperiod Arbitrage	22
	2.4	Pricing by No-Arbitrage	23
	2.5	Change of Numéraire	27
	2.6	Kramkov's Optional Decomposition Theorem	31
3	Util	ity Maximisation on Finite Probability Spaces	33
	3.1	The Complete Case	34
	3.2	The Incomplete Case	41
	3.3	The Binomial and the Trinomial Model	45
4	Back	helier and Black-Scholes	
	4.1	Introduction to Continuous Time Models	57
	4.2	Models in Continuous Time	57
	4.3	Bachelier's Model	
	4.4	The Black-Scholes Model	60



5	5.1	Kreps-Yan Theorem 71 A General Framework 71			
	5.2	No Free Lunch			
6	The	Dalang-Morton-Willinger Theorem 85			
	6.1	Statement of the Theorem 85			
	6.2	The Predictable Range			
	6.3	The Selection Principle			
	6.4	The Closedness of the Cone C			
	6.5	Proof of the Dalang-Morton-Willinger Theorem for $T = 1 \dots 94$			
	6.6	A Utility-based Proof of the DMW Theorem for $T = 1 \dots 96$			
	6.7	Proof of the Dalang-Morton-Willinger Theorem for $T \ge 1$ by Induction on T			
	6.8	Proof of the Closedness of K in the Case $T \geq 1 \dots 103$			
	6.9	Proof of the Closedness of C in the Case $T \geq 1$			
		under the (NA) Condition			
	6.10	Proof of the Dalang-Morton-Willinger Theorem for $T \geq 1$			
		using the Closedness of C			
	6.11	Interpretation of the L^{∞} -Bound in the DMW Theorem 108			
7	A Primer in Stochastic Integration				
	7.1	The Set-up			
	7.2	Introductory on Stochastic Processes112			
	7.3	Strategies, Semi-martingales and Stochastic Integration $\ldots117$			
8	Arbitrage Theory in Continuous Time: an Overview 129				
	8.1	Notation and Preliminaries			
	8.2	The Crucial Lemma			
	8.3	Sigma-martingales and the Non-locally Bounded Case 140			
Pa	rt II	The Original Papers			
9	A G	eneral Version of the Fundamental Theorem			
	of A	.sset Pricing (1994)149			
	9.1	Introduction149			
	9.2	Definitions and Preliminary Results155			
	9.3	No Free Lunch with Vanishing Risk160			
	9.4	Proof of the Main Theorem			
	9.5	The Set of Representing Measures			
	9.6	No Free Lunch with Bounded Risk186			
	9.7	Simple Integrands			
	0.8	Appendix: Some Measure Theoretical Lemmas 202			

10	A Simple Counter-Example to Several Problems
	in the Theory of Asset Pricing (1998)207
	10.1 Introduction and Known Results
	10.2 Construction of the Example
	10.3 Incomplete Markets
11	The No-Arbitrage Property
	under a Change of Numéraire (1995)217
	11.1 Introduction
	11.2 Basic Theorems
	11.3 Duality Relation
	11.4 Hedging and Change of Numéraire
12	The Existence of Absolutely Continuous
	Local Martingale Measures (1995)
	12.1 Introduction
	12.2 The Predictable Radon-Nikodým Derivative
	12.3 The No-Arbitrage Property and Immediate Arbitrage 239
	12.4 The Existence of an Absolutely Continuous
	Local Martingale Measure244
13	The Densel Same of Weekship Contingent Claims
10	The Banach Space of Workable Contingent Claims in Arbitrage Theory (1997)251
	13.1 Introduction
	13.2 Maximal Admissible Contingent Claims
	9
	13.3 The Banach Space Generated
	by Maximal Contingent Claims
	13.4 Some Results on the Topology of \mathcal{G}
	13.5 The Value of Maximal Admissible Contingent Claims
	on the Set \mathcal{M}^e
	13.6 The Space \mathcal{G} under a Numéraire Change
	13.7 The Closure of \mathcal{G}^{∞} and Related Problems
14	The Fundamental Theorem of Asset Pricing
	for Unbounded Stochastic Processes (1998)279
	14.1 Introduction
	14.2 Sigma-martingales
	14.3 One-period Processes
	14.4 The General \mathbb{R}^d -valued Case
	14.5 Duality Results and Maximal Elements
	14.5 Duality Results and Maximal Elements
15	A Compactness Principle for Bounded Sequences
	of Martingales with Applications (1999)319
	15.1 Introduction
	15.2 Notations and Preliminaries

XVI Contents

15.3 An Example	
15.4 A Substitute of Compactness	
for Bounded Subsets of \mathcal{H}^1	
15.4.1 Proof of Theorem 15.A	
15.4.2 Proof of Theorem 15.C	
15.4.3 Proof of Theorem 15.B	
15.4.4 A proof of M. Yor's Theorem	
15.4.5 Proof of Theorem 15.D	
15.5 Application	
Part III Bibliography	
References	