

1. Record Nr.	UNISA996495169703316
Titolo	The splendors and miseries of martingales : their history from the casino to mathematics / / edited by Laurent Mazliak, Glenn Shafer
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-031-05988-3
Descrizione fisica	1 online resource (419 pages)
Collana	Trends in the History of Science
Disciplina	780
Soggetti	Martingales (Mathematics) Martingales (Matemàtica) Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Intro -- Introduction -- Contents -- Part I In the Beginning -- 1 The Origin and Multiple Meanings of Martingale -- 1 Introduction -- 2 From Probability Back to Gambling -- 3 Are Martingales Foolish? -- 4 An Excursion Around Martigues -- 5 Back to Harnesses -- 6 The Ultimate Treachery of Martingales -- 2 Martingales at the Casino -- 1 Prelude -- 2 Introduction -- 3 The Casino -- 3.1 Trente et Quarante -- 3.2 The Business Model -- 3.3 The Paris Casinos -- 4 Gamblers' Fallacies -- 4.1 Two Moralists -- 4.2 The Blatant Rogue -- 4.3 The Failed Mathematician -- 4.4 The Many-Talented Gambler -- 5 Betting Systems and Game Theory -- 3 Émile Borel's Denumerable Martingales, 1909-1949 -- 1 Introduction -- 2 Martingales of Fathers of Families -- 3 Borel's Martingales -- 4 The Dawn of Martingale Convergence: Jessen's Theorem and Lévy's Lemma -- 1 Introduction -- 2 Jessen's Theorem -- 2.1 Magister Thesis 1929 -- 2.2 Doctoral Thesis 1930 -- 2.3 The Acta Article 1934 -- 2.4 A Probabilistic Interlude 1934-1935 -- 2.5 After 1934 -- 3 Lévy's Lemma -- 3.1 Before 1930 -- 3.2 Lévy's Denumerable Probabilities -- *-20pt Part II Ville, Lévy and Doob -- 5 Did Jean Ville Invent Martingales? -- 1 Introduction -- 2 A Glimpse of Jean Ville -- 3 Probability as Ville Encountered It in the Early 1930s -- 4 Martingales in Probability Before Ville -- 5 Combining Game Theory with Denumerable Probability -- 6 Legacy -- 7 A Final Question -- 6

Paul Lévy's Perspective on Jean Ville and Martingales -- 1 Introduction
-- 2 Lévy and His Martingale Condition -- 2.1 Lévy's Growing Interest
in Probability -- 2.2 Genesis of Lévy's Martingale Condition -- 2.3
Chapter VIII of the Book Théorie de l'addition des variables aléatoires
-- 3 Lévy Versus Ville -- 4 Conclusion -- 7 Doob at Lyon: Bringing
Martingales Back to France -- 1 The Colloquium -- 2 Paul Lévy -- 3
Jean Ville -- 4 Joseph Doob.
5 At the Colloquium -- 6 Doob's Lecture -- 6.1 Strong Law of Large
Numbers -- 6.2 Inverse Probability -- *-20pt Part III Modern Probability
-- 8 Stochastic Processes in the Decades after 1950 -- 1 Introduction
-- 2 Probability Around 1950 -- 2.1 Early Developments -- 2.2
``Stochastic Processes'' -- 3 The Great Topics of the Years 1950-1965
-- 3.1 Markov Processes -- 3.2 Development of Soviet Probability --
3.3 Classical Potential Theory and Probability -- 3.4 Theory of
Martingales -- 3.5 Markov Processes and Potential -- 3.6 Special
Markov Processes -- 3.7 Connections Between Markov Processes and
Martingales -- 4 The Period 1965-1980 -- 4.1 The Stochastic Integral
-- 4.2 Markov Processes -- 4.3 General Theory of Processes -- 4.4
Inequalities of Martingales and Analysis -- 4.5 Martingale Problems --
4.6 ``Stochastic Mechanics'' -- 4.7 Relations to Physics -- 5 After
1980 -- 5.1 The ``Malliavin Calculus'' -- 5.2 Stochastic Differential
Geometry -- 5.3 Distributions and White Noise -- 5.4 Large Deviations
-- 5.5 Noncommutative Probability -- 5.6 Omissions -- 9 Martingales
in Japan -- 1 Before 1960: Itô's Stochastic Analysis -- 2 Japanese
Contributions to Martingales from 1961 to 1970 -- 2.1 The Doob-
Meyer Decomposition Theorem for Supermartingales -- 2.2 Stochastic
Integrals for Square-Integrable Martingales and Semimartingales -- 2.3
Martingale Representation Theorems -- 3 Japanese Contributions to
Martingales After 1971 -- 3.1 Fisk-Stratonovich Symmetric Stochastic
Integrals. Itô's Circle Operation -- 3.2 Itô-Tanaka's Formula and Local
Times -- 3.3 Problems Concerning Filtrations -- 10 My Encounters with
Martingales -- 1 Studying at the University of Berlin Right After the War
-- 2 Collecting Building Blocks for Martingale Theory -- 3 A Year in
Illinois -- 4 Final Work Till 1964 -- *-20pt Part IV Modern Applications.
11 Martingales in the Study of Randomness -- 1 Introduction -- 2
Richard von Mises's Collectives -- 3 Abraham Wald's Clarification -- 4
Jean Ville's Martingales -- 5 The Status Quo of the 1950s -- 6 The
Invention of the Algorithmic Definition of Randomness in the 1960s --
6.1 Kolmogorov -- 6.2 Solomonoff -- 6.3 Chaitin -- 7 Martin-Löf's
Definition of Randomness -- 8 Claus-Peter Schnorr's Computable
Martingales -- 9 Leonid Levin's Semimeasures -- 10 Characterizing
Martin-Löf Randomness Using Complexity -- 10.1 Leonid Levin in the
Soviet Union -- 10.2 Monotone Complexity: Levin and Schnorr -- 10.3
Prefix Complexity -- 11 After the 1970s -- 12 Encounters with
Martingales in Statistics and Stochastic Optimization -- 1 Introduction
-- 2 Setting the Stage -- 2.1 Harold Hotelling -- 2.2 Abraham Wald --
2.3 Herbert Robbins -- 3 Sequential Testing and Confidence Intervals
-- 3.1 Wald's Seminal Work During the Second World War -- 3.2
Sequential Tests with Power 1 and Confidence Sequences -- 3.3 BHAT
and Time-Sequential Survival Analysis -- 4 Martingales in Sequential
Design of Experiments and Bandit Problems -- 5 Stochastic
Approximation (SA) and Adaptive SA -- 6 Martingales and Biorhythms
in Time Series -- 7 Martingales in Stochastic Optimization, 1987-2021
-- 7.1 Contextual Bandits in Reinforcement Learning and
Personalization, Modified Gradient Boosting and SA in AI -- 7.2 Joint
State and Parameter Estimation in Hidden Markov Models, with
Uncertainty Quantification -- 8 Concluding Remarks -- 13 Martingales
in Survival Analysis -- 1 Introduction -- 2 The Hazard Rate and a

Martingale Estimator -- 3 Stochastic Integration and Statistical Estimation -- 4 Stopping Times, Unbiasedness and Independent Censoring -- 5 Martingale Central Limit Theorems -- 6 Two-Sample Tests for Counting Processes -- 7 The Copenhagen Environment. 8 From Kaplan-Meier to the Empirical Transition Matrix -- 9 Pustulosis Palmo-Plantaris and ps: [/EMC pdfmark [/Subtype /Span /ActualText (k) /StPNE pdfmark [/StBMC pdfmarkkps: [/EMC pdfmark [/StPop pdfmark [/StBMC pdfmark-Sample Tests -- 10 The Cox Model -- 11 The Monograph Statistical Models Based on Counting Processes -- 12 Limitations of Martingales -- 14 Encounters with Martingales in Stochastic Control -- 1 Introduction -- 2 Frequency Domain Methods for Control and Estimation -- 3 Time Domain Methods for Control and Estimation -- 4 Nonlinear Stochastic Control -- 5 Some Other Related Stochastic Optimization Problems -- 6 Appendix (by Laurent Mazliak): Martingale Problems and Stochastic Control of General Processes -- 6.1 Strong and Weak Solutions of Stochastic Differential Equations. Martingale Problems -- 6.2 General Formulation of a Control Problem -- *-20pt Part V Documents -- 15 Analysis or Probability? Eight Letters Between Børge Jessen and Paul Lévy -- 1 Introduction -- 2 Lévy to Jessen. Paris, 27 September 1934 -- 3 Lévy to Jessen. Paris, 4 April 1935 -- 4 Jessen to Lévy. Undated Draft, About 8 April 1935 -- 5 Lévy to Jessen. Hennequeville, 24 April 1935 -- 6 Lévy to Jessen. Paris, 3 May 1935 -- 7 Jessen to Lévy. Copenhagen, 11 August 1935 -- 8 Lévy to Jessen. S. Cristina, 23 August 1935 -- 9 Bohr and Jessen to Lévy. Copenhagen, 14 July 1947 -- 16 Counterexamples to Abstract Probability: Ten Letters by Jessen, Doob and Dieudonné -- 1 Introduction -- 2 Jessen to Doob, 11 May 1948 -- 3 Doob to Jessen, 17 May 1948 -- 4 Jessen to Doob, 29 May 1948 -- 5 Doob to Jessen, 4 June 1948 -- 6 Jessen to Dieudonné, 17 June 1948 -- 7 Dieudonné to Jessen, Nancy, 28 June 1948 -- 8 Jessen to Dieudonné, 13 September 1948 -- 9 Jessen to Doob, 13 September 1948 -- 10 Jessen to Doob, 17 May 1949 -- 11 Jessen to Doob, 23 June 1949. 17 Jean Ville Remembers Martingales -- 1 Introduction -- 2 Letter from Crépel to Ville, 22 August 1984 -- 3 Crépel's Interview of Ville, 27 August 1984 -- 3.1 Mathematics in France in the 1930s -- 3.2 Vienna and Karl Menger -- 3.3 Random Sequences and Martingales -- 3.4 Probability Back in France -- 3.5 Other Aspects of Probability -- 3.6 Economics -- 3.7 Computing at the University of Paris -- 4 Letter from Crépel to Ville, 21 January 1985 -- 5 Letter from Ville to Crépel, 2 February 1985 -- 5.1 First Note -- 5.2 Second Note -- 5.3 Third Note -- 18 Seven Letters from Paul Lévy to Maurice Fréchet -- 1 Introduction -- 19 Andrei Kolmogorov and Leonid Levin on Randomness -- 1 Introduction -- 2 Letter from Kolmogorov to Fréchet, 1939 -- 3 Abstracts of Three Talks by Kolmogorov, 1967-1974 -- 3.1 31 October 1967 -- 3.2 23 November 1971 -- 3.3 16 April 1974 -- 4 Three Letters from Levin to Kolmogorov 1970-1971 -- 4.1 Letter I -- 4.2 Letter II -- 4.3 Letter III -- Index.
