

1. Record Nr.	UNINA9910799493903321
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Titolo	WAIC and WBIC with Python Stan : 100 Exercises for Building Logic / / Joe Suzuki
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore Pte Ltd, , [2023] ©2023
ISBN	981-9938-41-4
Edizione	[First edition.]
Descrizione fisica	1 online resource (249 pages)
Disciplina	519.542
Soggetti	Bayesian statistical decision theory Logic, Symbolic and mathematical
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface: Sumio Watanabe-Spreading the Wonder of Bayesian Theory -- One-Point Advice for Those Who Struggle with Math -- Features of This Series -- Contents -- 1 Overview of Watanabe's Bayes -- 1.1 Frequentist Statistics -- 1.2 Bayesian Statistics -- 1.3 Asymptotic Normality of the Posterior Distribution -- 1.4 Model Selection -- 1.5 Why are WAIC and WBIC Bayesian Statistics? -- 1.6 What is ``Regularity" -- 1.7 Why is Algebraic Geometry Necessary for Understanding WAIC and WBIC? -- 1.8 Hironaka's Desingularization, Nothing to Fear -- 1.9 What is the Meaning of Algebraic Geometry's in Bayesian Statistics? -- 2 Introduction to Watanabe Bayesian Theory -- 2.1 Prior Distribution, Posterior Distribution, and Predictive Distribution -- 2.2 True Distribution and Statistical Model -- 2.3 Toward a Generalization Without Assuming Regularity -- 2.4 Exponential Family -- 3 MCMC and Stan -- 3.1 MCMC and Metropolis-Hastings Method -- 3.2 Hamiltonian Monte Carlo Method -- 3.3 Stan in Practice -- 3.3.1 Binomial Distribution -- 3.3.2 Normal Distribution -- 3.3.3 Simple Linear Regression -- 3.3.4 Multiple Regression -- 3.3.5 Mixture of Normal Distributions -- 4 Mathematical Preparation -- 4.1 Elementary Mathematics -- 4.1.1 Matrices and Eigenvalues -- 4.1.2 Open Sets, Closed Sets, and Compact Sets -- 4.1.3 Mean Value Theorem and Taylor Expansion -- 4.2 Analytic Functions -- 4.3 Law of Large Numbers and Central Limit Theorem -- 4.3.1 Random Variables

-- 4.3.2 Order Notation -- 4.3.3 Law of Large Numbers -- 4.3.4 Central Limit Theorem -- 4.4 Fisher Information Matrix -- 5 Regular Statistical Models -- 5.1 Empirical Process -- 5.2 Asymptotic Normality of the Posterior Distribution -- 5.3 Generalization Loss and Empirical Loss -- 6 Information Criteria -- 6.1 Model Selection Based on Information Criteria -- 6.2 AIC and TIC -- 6.3 WAIC. 6.4 Free Energy, BIC, and WBIC -- 7 Algebraic Geometry -- 7.1 Algebraic Sets and Analytical Sets -- 7.2 Manifold -- 7.3 Singular Points and Their Resolution -- 7.4 Hironaka's Theorem -- 7.5 Local Coordinates in Watanabe Bayesian Theory -- 8 The Essence of WAIC -- 8.1 Formula of State Density -- 8.2 Generalization of the Posterior Distribution -- 8.3 Properties of WAIC -- 8.4 Equivalence with Cross-Validation-Like Methods -- 9 WBIC and Its Application to Machine Learning -- 9.1 Properties of WBIC -- 9.2 Calculation of the Learning Coefficient -- 9.3 Application to Deep Learning -- 9.4 Application to Gaussian Mixture Models -- 9.5 Non-informative Prior Distribution -- References -- -- Index.
