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1.8.2 Continuous distributions2 Dirichlet distribution; 2.1 Definition and basic properties; 2.1.1 Density function and moments; 2.1.2 Stochastic representations and mode; 2.2 Marginal and conditional distributions; 2.3 Survival function and cumulative distribution function; 2.3.1 Survival function; 2.3.2 Cumulative distribution function; 2.4 Characteristic functions; 2.4.1 The characteristic function of u ~ U(Tn); 2.4.2 The characteristic function of v ~ U(Tn); 2.4.3 The characteristic function of a Dirichlet random vector; 2.5 Distribution for linear function of a Dirichlet random vector
2.5.1 Density for linear function of v ~ U(Vn)2.5.2 Density for linear function of u ~ U(Tn); 2.5.3 A unified approach to linear functions of variables and order statistics; 2.5.4 Cumulative distribution function for linear function of a Dirichlet random vector; 2.6 Characterizations; 2.6.1 Mosimann's characterization; 2.6.2 Darroch and Ratcliff's characterization; 2.6.3 Characterization through neutrality; 2.6.4 Characterization through complete neutrality; 2.6.5 Characterization through global and local parameter independence; 2.7 MLEs of the Dirichlet parameters
2.7.1 MLE via the Newton-Raphson algorithm2.7.2 MLE via the EM gradient algorithm; 2.7.3 Analyzing serum-protein data of Pekin ducklings; 2.8 Generalized method of moments estimation; 2.8.1 Method of moments estimation; 2.8.2 Generalized method of moments estimation; 2.9 Estimation based on linear models; 2.9.1 Preliminaries; 2.9.2 Estimation based on individual linear models; 2.9.3 Estimation based on the overall linear model; 2.10 Application in estimating ROC area; 2.10.1 The ROC curve; 2.10.2 The ROC area; 2.10.3 Computing the posterior density of the ROC area
2.10.4 Analyzing the mammogram data of breast cancer

Sommario/riassunto

The Dirichlet distribution appears in many areas of application, which include modelling of compositional data, Bayesian analysis, statistical genetics, and nonparametric inference. This book provides a comprehensive review of the Dirichlet distribution and two extended versions, the Grouped Dirichlet Distribution (GDD) and the Nested Dirichlet Distribution (NDD), arising from likelihood and Bayesian analysis of incomplete categorical data and survey data with non-response. The theoretical properties and applications are also reviewed in detail for other related distributions, such as the in

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Second order stability for the Monge-Ampere equation and applications; 4.1. Proof of Theorem 4.1; 4.2. Proof of Theorem 4.2; Chapter 5 The semigeostrophic equations; 5.1. The semigeostrophic equations in physical and dual variables; 5.2. The 2-dimensional periodic case; 5.2.1. The regularity of the velocity field 5.2.2. Existence of an Eulerian solution5.2.3. Existence of a Regular Lagrangian Flow for the semigeostrophic velocity field; 5.3. The 3-dimensional case; Chapter 6 Partial regularity of optimal transport maps; 6.1. The localization argument and proof of the results; 6.2. C1, regularity and strict c - convexity; 6.3. Comparison principle and C2, regularity; Appendix A Properties of convex functions; Appendix B A proof of John lemma; References; THESES; Published volumes; Volumes published earlier

Sommario/riassunto

In this thesis, we study the regularity of optimal transport maps and its applications to the semi-geostrophic system. The first two chapters survey the known theory, in particular there is a self-contained proof of Brenier' theorem on existence of optimal transport maps and of Caffarelli's Theorem on Holder continuity of optimal maps. In the third and fourth chapter we start investigating Sobolev regularity of optimal transport maps, while in Chapter 5 we show how the above mentioned results allows to prove the existence of Eulerian solution to the semi-geostrophic equation. In Chapter 6 we prove partial regularity of optimal maps with respect to a generic cost functions (it is well known that in this case global regularity can not be expected). More precisely we show that if the target and source measure have smooth densities the optimal map is always smooth outside a closed set of measure zero.