

MASTER'S THESIS

Isotropy test and variance estimation for high order statistics of spatial point process

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Isotropy Test and Variance Estimation for High Order Statistics of Spatial Point Processes

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Abstract

Spatial point processes are stochastic models for analyzing spatial point patterns. In this thesis, we derive a method to test whether a given point pattern is a realization of an isotropic (rotation-invariant) model, based on the Voronoi diagram of the given point pattern. Monte Carlo procedure is employed to approximate the distribution of the test statistic. We demonstrate the power of the proposed test through simulation, compared it with the best isotropy test to-date, and applied to the *Ambrosia dumosa* data. Moreover, we introduce high order statistics of multivariate spatial point process and propose variance estimation procedure for them. Under some mild conditions, we prove that the proposed variance estimator is consistent for the target variance.

Table of Contents

Declaration	i
Abstract	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
Chapter 1 Introduction	1
1.1 Spatial point process.....	1
1.2 Isotropy test of spatial point processes.....	2
1.3 Preliminary knowledge for variance estimation.....	3
Chapter2 Isotropy test for spatial point processes	5
2.1 Introduction.....	5
2.2 A test for isotropy.....	8
2.2.1 Voronoi tessellations.....	8
2.2.2 Test statistic.....	9

2.3 Numerical studies.....	14
2.3.1 Competitor.....	14
2.3.2 Alternative methods.....	15
2.3.3 The real data-Ambrosia dumosa data.....	26
2.4 Conclusion.....	28

Chapter3 Variance estimation for high order statistics of spatial point processes **29**

3.1 Introduction.....	29
3.2 Variance estimation.....	33
3.2.1 The proposed estimator.....	34
3.2.2 Consistency.....	38
3.3 Proof.....	41
3.4 Conclusion.....	54

List of references **55**

Curriculum Vitae **59**