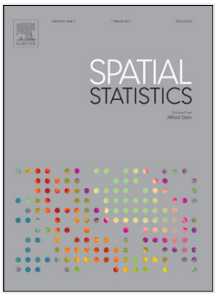
Accepted Manuscript



Distance to the border in spatial point patterns

Michele Joyner, Chelsea Ross, Edith Seier

PII: S2211-6753(13)00034-1
DOI: http://dx.doi.org/10.1016/j.spasta.2013.05.002
Reference: SPASTA 32

To appear in: *Spatial Statistics*

Received date: 2 January 2013
Accepted date: 29 May 2013

Please cite this article as: Joyner, M., Ross, C., Seier, E., Distance to the border in spatial point patterns. *Spatial Statistics* (2013), http://dx.doi.org/10.1016/j.spasta.2013.05.002

Distance to the Border in Spatial Point Patterns

Michele Joyner[a,b], Chelsea Ross[a,c], Edith Seier[a,b]

[a] *Department of Mathematics & Statistics*
PO Box 70663
East Tennessee State University, Johnson City, TN, USA 37614
[b] *Institute for Quantitative Biology*
East Tennessee State University, Johnson City, TN, USA
[c] *Department of Biological Sciences*
East Tennessee State University, Johnson City, TN, USA

Abstract

The analysis of spatial point patterns is commonly focused on the distances to the nearest neighbor. The distance of organisms to the edge of the enclosure is also of interest in some biological studies performed in the laboratory. We define the B (border) function and derive its shape assuming complete spatial randomness (CSR) for square, rectangular, circular, and some three-dimensional arenas. The idea is then extended outside the laboratory setting to work with maps and points located in geographical regions. Commands in R ([1]) to calculate and plot the empirical $\hat{B}$ function are included. The B function, based on distances to the nearest edge, in addition to the G function, based on distances to the nearest neighbor, contributes to the understanding of the spatial distribution of the points.

Keywords: distance to nearest edge, nearest neighbor, maps, experimental enclosures

1. Introduction

Statistical methods to analyze spatial point patterns are used in several fields such as ecology, public health, and biology. In the analysis of spatial point patterns, the distances from each point to its nearest neighbor receives

Email addresses: joynerm@etsu.edu (Michele Joyner), seier@etsu.edu (Edith Seier)