A Robotics Approach to Analysis of Non-Isotropic Random Walks

Dustin Atchley
Davidson College
209 Ridge Road
Davidson, NC, 20835-5026
+1(828)447-8045
duatchley@davidson.edu

Juan Gutierrez
University of Georgia
200 D. W. Brooks Drive, Office 440
Boyd Building, Athens, GA 30602
+1(706)542-2609
jgutierr@uga.edu

ABSTRACT
A random walk is a path that is comprised of random steps taken in random directions. Random walks present themselves in a variety of environments, and for this reason they have been a subject of relevance spanning disciplines ranging from economics to biology. A cycle in a random walk consists of the choice of a random direction, followed by a step forward, occurring for some duration. We investigated isotropic and non-isotropic random walks involving the following four cycle variations: 1. constant time, constant step size 2. constant time, varied step size 3. varied time, constant step size 4. varied time, varied step size. In biological terms, these cases of a random walks are of interest in modeling dispersal of organisms. In this study we have attempted to establish a mechanism to better study cases of "non-normal" diffusion in a population using a simplistic model.

Categories and Subject Descriptors
G.1.8 [**Numerical Analysis**]: Partial Differential Equations – *finite difference methods, iterative solution techniques.*

General Terms
Your general terms must be any of the following 16 designated terms: Measurement, Design, Experimentation, Verification.

Keywords
Bioinformatics, Random Walks, Isotropic, Analysis, Experimental Methods

ACKNOWLEDGMENTS
Our thanks to ACM SIGCHI for allowing us to modify templates they had developed.

BCB '15, September 9 - 12, 2015, Atlanta, GA, USA

http://dx.doi.org/10.1145/2808719.2811434