Annotated bibliography

1. Bowditch Adam. et al (2018). Central limit theorems for biased randomly trapped random walks on Z. Pages 1-31.

Bowditch’s research article “Central limit theorems for biased randomly trapped random walks on Z” , goal is to create subcritical Galton-Watsons trees capable of “surviving” in an environment with a range of biased values. To accomplish this, he uses the Central Limit Theorem and proved that it is applicable in biased randomly trapped random walks in one dimension. Bowditch establishes other variables, such as: conditions on trapping, sequence regeneration times, and an environment dependent centering. While Bowditch’s abstract clearly explain the goal and method, the introduction section mainly focuses on the proofs about the Central limit theorem for a specific environment. This introduction expects an audience with a strong knowledge in mathematics, specifically statistics. Compared to other articles, this article is purely a proof on the model so other sections normally seen in STEM articles (such as: discussion, results, methods) are excluded. This creates a different expectation for readers and creates some confusion at times. However the abstract is clear so the readers can use it as a pathway to know what to expect in each paragraph within the introduction. The introduction also explains each proof to connect them towards their main goal. Bowditch uses a slightly different format from the usual STEM format, due to relying purely on mathematics with some difficult proofs to comprehend, his abstract and introduction is surprisingly clear.

2. Duffy J. Kevin. et al (1995). Random Walk Calculations for Bacterial Migration in Porous Media. Volume 68. Pages 800-806.

In Kevin J. Duffy’s “Random Walk Calculations for Bacterial Migration in Pourous Media”, Duffy’s main interest is to produce a model observing the behavior of bacterial migration in porous media. To accomplish this, Duffy incorporates bacterial migration in fluids and uses population balance equations and cellular level simulations to describe the microscopic motion of bacteria. He applies a random walk algorithm to simulate bacterial migrations and uses the Einstien relation to calculate the effective bacterial diffusion coefficient. To compare his results, he uses the tortuosity (found from his algorithm) as a function of particle size and compares it to his experimental results.

3. He Dong Xue. et al (2018). Two explicit Skorokhod embeddings for simple symmetric random walk. Pages 1-15.

In Xue Dong He’s research article “Two explicit Skorohod embedding for simple symmetric random walk” Xue Dong He’s main motivation for the article is to observe behavioral finance, in particular the behavioral finance of a gambler in a casino. To do this, Xue Dong He provided two explicit construction of randomized stopping time. By doing so, Dong He uses the central distribution, μ (given from the exploit construction of randomized stopping time), and implemented into his simple random walk in a uniformly integrable manner. Dong He utilizes two construction models: Markovian structure and Azema-Yor solution (the discrete analogue). These two models are used to observe the effects of his independent variable, in this case a coin, and have a better understanding of the gambler during the moment.

4. Kim Song-Ju. et al (2016). Random walk with chaotically driven bias. Pages 1-9.

In Song-Ju Kim’s research article “ Random walk with chaotically driven bias”, Song-Ju Kim investigates two types of random walk with the parameter, fluctuating probability. The two types of random walks are: the time-quenched framework with bias times (such as periodic, quasi-periodic, or chaotic time series) and time-annealed framework with a fluctuating bias generated from a stochastic process. Song-Ju Kim observations from these two models show in time-quenched framework’s diffusive properties can be found it the time-average variance but not the average mean square. In the time-annealed framework, Kim can analytically and numerically show the diffusion and compares its similarity to the Levy-walk.

5. Masuda Naoki. et al (2017). Random walks and diffusion networks. Volumes 716-717. Pages 1-58.

In Naoki Masuda’s research article “Random walks and diffusion networks”, Masuda’s goal is to investigate the theory and application of random walks on networks with some restrictions. These restrictions include: the model will be for simple cases and our random “walkers” are non-adaptive. Masuda also categorizes three types of random walks: discrete-time, node-centric countinuous time, and edge centric countinuous-time. Finally, Masuda will discuss applications of random walks, and ranking of nodes, in applications such as: community detection, respondent-driven sampling, and opinion models (in particular the voter model).