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Peer Review

# Review of: "Aspects of a Randomly Growing Cluster in ℝ^2, d≥2"

**Wai-Kit Lam**[1]

1. Department of Mathematics, National Taiwan University, Taiwan, Province of China

This short paper studies a point process on $\mathbb{R}^d$, which is defined as follows. First, start with $X_1 = 0$. Once $X_{i-1}$ is defined, one chooses an integer $j$ uniformly at random from $\{1, \ldots, i-1\}$, and defines $X_i = X_j + D_i$, where $D_i$ is a random vector in $\mathbb{R}^d$ whose entries are independent centered normal random variables with variance $i^{-\alpha}$ for some fixed $\alpha > 0$. The authors focus on the diameter of the cluster, and also the asymptotic length of the minimum spanning tree of the first $n$ points of this cluster.

The paper is not difficult to follow, and the results are interesting. It is suitable for publication in Qeios.

Here are some minor suggestions:

1. It would be helpful to say something about the motivation for considering such a point process in the introduction section. Why is this growing cluster interesting? Why these specific variances? Is it connected to some other models or processes? Are there any potential applications?
2. The sentence before Theorem 1: The tail should be Gaussian instead of just exponential. Also, it should be $\rho(\mathcal{X}_\infty)$ instead of just $\rho(\mathcal{X})$.
3. Section 2, definition of $T_n$: What is $\pi(i)$?
4. Section 2, definition of $\zeta(2)$: It should be $k = 1$ instead of $k - 1$.
5. The displayed inequalities after (3): If I understand correctly, you are actually bounding $\mathbb{P}(\exists i \in [k_1, k_2]\colon \mathcal{E}(i, \ell, L) \text{ occurs for some } \ell)$. (Otherwise, the $i^{-4}$ bound would not be needed.)
6. Section 3.2.1: It would be helpful to point out (briefly) how the Polya--Eggenburger Urn is related to the spanning tree.

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## Declarations

**Potential competing interests:** No potential competing interests to declare.


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