

sci.math: Re: how to calculate the expected distance from a point to the center in square grid?

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"Leonardo B. Oliveira" <leob@dcc.ufmg.br> wrote:

- > *The expected distance between a random point*
- > *(i.e., a point picked at random) in a circle of*
- > *radius R and the center of this circle*
- > *is $R \sqrt{2}/2$ – as shown in "Estimating Hop=20*
- > *Counts in Position Based Routing Schemes for Ad Hoc"*

I'm not familiar with that article.

And I must wonder if you're presenting their result accurately. It seems to me that what you have described as "expected distance" should be merely the average distance from the center of the circle to points within it, and that distance is $2/3 * R$, not $\sqrt{2}/2 * R$.

- > *But and what about the expected distance from random*
- > *point to the center of a square grid, say $n \times n$?*

To make this case easily comparable to that of the circle, let's say instead that we're dealing with a square of side length $2 * R$. The average distance from the center of the square to points within it is then

$$(\sqrt{2} + \log(1 + \sqrt{2})) * R .$$

David Cantrell