a cluster growth process in which particles start at one or more sources within a cluster, diffuse outward, and are added to the cluster at the first site outside it they reach

Given the number of particles `Npart` in the process, the size of the plane consisting of grids can be denoted by `Ngrid*Ngrid`, where `Ngrid` is given by `ceil(1.2*sqrt(Npart))`. Each particle starts to move at the origin $(0, 0)$ ...

For instance, when we simulates an IDLA with 100,000 particles, the standard deviation equals 0.7217.

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0.1 The Upper Bound of L_2 Error of the Discretization

Followed by the equation (2.1), we define the average radius of $\mathcal{D}_R$ as

$$\text{Rad } \mathcal{D}_R = \frac{1}{N} \sum_{i=0}^{N-1} \sqrt{m_i^2 + n_i^2}. \tag{0.1}$$

For $q \geq 1$, we define the q-error of the discretization to be

$$\text{Err}_q \, \mathcal{D}_R = (\frac{1}{N} \sum_{i=0}^{N-1} ||p_i - R(\cos\phi_i, \sin\phi_i)||_q^q)^{\frac{1}{q}}, \ \phi = \arctan(m_i, n_i). \tag{0.2}$$

(a derivation from $Err_q \, \mathcal{D}_R$ to L_2 error)
For $q = 2$, we have the L_2 error

$$\text{Err}_2 \, \mathcal{D}_R = (\frac{1}{N} \sum_{i=0}^{N-1} (m_i^2 + n_i^2) - R^2)^{\frac{1}{2}}. \tag{0.3}$$