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Exercise No. 2

Peer-To-Peer Networks

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Exercise 1 *Given a CAN with a perfectly balanced distribution of n peers with two dimensions and two realities. Consider the greedy algorithm, which chooses the closest peer according to the distance metric in both realities.*

1. *How many peers are in distance r from a given peer, if one does not change the reality? Denote by L this set of peers.*
2. *How many random peers x have to be picked from the set of all peers, such that at least one node of L is picked, e.g. $\frac{1}{2}$? What if we want to achieve high probability?*
3. *Find the optimal L such that $x + r$ are minimal.*
4. *What is the relationship between $x + r$ and the duration of the greedy search?*