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Self-Avoiding Walks and Trees

A long chain molecule can be crudely modeled as a sequence of N points in $\mathbb{R}^d$ where the first point is at the origin. The sequence is admissible if each point is the centre of a sphere such that the spheres are non-overlapping but touching each other in accordance with the topology of a chain. By putting a uniform distribution on the subset of $\mathbb{R}^{Nd}$ consisting of admissible sequences we can address basic questions such as what is the expected end-to-end distance when N is large? Analogous questions can be posed for molecules with other topologies such as trees. An even more basic model for a long chain molecule is self-avoiding walk on the simple cubic lattice $\mathbb{Z}^d$. I will review and dicuss recent results related to this class of problems.