Computational Physics II

Henrik Christiansen (course organized by Subhajit Paul)

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1 Self-Avoiding Walks

Implement Rosenbluth sampling of self-avoiding walks in $d = 2$ (or alternatively $d = 3$). Simulate self-avoiding walks up to length $N = 15$ and calculate the end-to-end distance $R_{\mathrm{ee}} = R_N - R_1$ and squared radius-of-gyration $R_{\mathrm{g}}^2 = \frac{1}{N}\sum_{i=1}^{N}(\vec{r}_i - \vec{r}_{\mathrm{cm}})$, where $\vec{r}_{\mathrm{cm}}$ is the center-of-mass.

1. Compare your results to the results obtained from exact enumeration of SAWs of the same length.
2. Implement random samping of SAWs, where you chose one of the neighbouring sites random and throw away walks that would self-intersect.
3. In addition to above mentioned random sampling, chose one of the unoccupied sites randomly (but do not keep track of the weights).
4. (Extra): Check what happens if you chose one of the neighbour sites randomly, but exclude the "trivial back" move.