PRESSURE EXERTED BY A GRAFTED POLYMER ON A MEMBRANE

Rafael Mynssem Brum\textsuperscript{1} and Jürgen Fritz Stilck\textsuperscript{2}

\textsuperscript{1}Instituto de Física
Universidade Federal Fluminense
Av. Litorânea s/n, 24210-346 Niterói, RJ, Brazil
rafaelmynssemm@if.uff.br

\textsuperscript{2}Instituto de Física and National Institute of Science and Technology for Complex Systems
Universidade Federal Fluminense
Av. Litorânea s/n, 24210-346 Niterói, RJ, Brazil
jstilck@if.uff.br

Abstract

A problem of great interest to both areas, physics and biology, determining the pressure exerted by a grafted polymer to a membrane, like a protein chain fixed to a cell. We solve the problem of a chain, modeled as a self-avoiding walk (SAW), grafted to a rigid wall limiting a semi-infinite Bethe lattice of arbitrary coordination number \( q \). In particular, we determine the pressure exerted by the polymer on the wall, as a function of the distance to the grafting point. The pressure, in general, decays exponentially with the distance, at variance with what is found for SAWs and directed walks on regular lattices and gaussian walks. The adsorption transition, which is discontinuous, and its influence on the pressure are also studied.

References