Polymer Chain Simulation Report

# Abstract

This document presents the findings from a simulation experiment involving the generation of 2000 polymer chains with varied segment lengths. The purpose of this simulation was to analyze the behavior of the polymer chains in 3D space, focusing on their mean squared end-to-end distance.

# Introduction

The study of polymer chains in three-dimensional space provides valuable insights into material science, chemistry, and physics. By simulating different configurations of polymer chains, researchers can understand how the length of the chain affects its overall properties.

# Methods

The polymer chains were each comprised of N segments with a length of 1. The orientation of each segment was assigned randomly in 3D space, ensuring a uniform distribution. For our analysis, we considered chain lengths of N = 10, 50, 100, 200, and 400.

# Results

Our findings show a clear pattern of the mean squared end-to-end distance varying with the number of segments. Specifically, we observed the scaling relationship known as 'Flory's idealized model' in polymer physics (Fig. 1 - h2vsN.png). Additionally, selected conformations of polymer chains for each N have been visualized and collated into respective figures (e.g., Fig. 2 - Chain3D10.png, Fig. 3 - Chain3D50.png).