

## Brownian dynamics simulation of a single DNA molecule in polymer solution

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Brownian dynamics simulation is widely used for describing behaviors of an individual DNA molecule. A DNA molecule is represented by the bead-spring model that beads affected by hydrodynamic force are connected to springs for which worm-like chain model is used. Behaviors of a single DNA molecule in extension flow and shear flow are well explained with the models. But the model has limit for representing behaviors of DNA molecules because of infinite dilution assumption which means interaction between DNA and polymers in solution is negligible. Being in porous media such polymer matrix, DNA molecules are influenced by constraint force from the media. As the result of the constraint force, DNA molecules do tube-like-motion. Reptation model which represents the behavior of a single polymer strand in polymer matrix is applied to this Brownian dynamic simulation. The results are simulated the behaviors of a DNA molecule in porous media with external electric field to understand the dynamics of a DNA.