

Technische Universität Dresden • Faculty of Mathematics

# Diffusitivity of deformable cells

Master's thesis

to obtain the second degree

***Master of Science***  
***(M.Sc.)***

written by

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# Contents

# 1 Introduction

I will cite [?] for sure.

## 2 Cell model

- \* introduce the Discrete cell form (DCF)
- can i just reference my bachelor thesis or how should i do that?

### 2.1 Discrete cell form

- \* the discrete cell form consists of a list that holds all wall points in consecutive order

### 2.2 Cell dynamics

- \* area force
- \* edge force
- \* interior angle force
- \* overlap force

### 2.3 Numerical solver

- \* DifferentialEquations.jl solver \* `solve(probcell1, EM(), dt = timeStepSize)` \* - > *EulerMaruyamamethodwithfixedtimestepsize*

### 3 Sanity check

\* After introducing cell model and dynamics, we want to check whether it shows the same dynamics as the billiard model from [?] when setting the parameters such that the cells should have the same characteristics.

## References

- [Bruna and Chapman, 2012] Bruna, M. and Chapman, S. J. (2012). Excluded-volume effects in the diffusion of hard spheres. *Phys. Rev. E*, 85:011103.

## Statement of authorship

I hereby declare that I have written this thesis (*Diffusitivity of deformable cells*) under the supervision of Jun.-Prof. Dr. Markus Schmidtchen independently and have listed all used sources and aids. I am submitting this thesis for the first time as part of an examination. I understand that attempted deceit will result in the failing grade „not sufficient“ (5.0).

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Tim Vogel

Dresden, December 12, 2024

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