Galaxy Generation

Jugend Forscht 2018

Emile Hansmaennel

Theodor Fliedner Gymnasium

February 14, 2018

Point Cloud

- Random generation of points
- Random-Sampling with the NFW-profile
- Saving the stars

Forces

- Generating a grid for subdividing the galaxy into cells
  - Generating the spheres
  - Finding out which star is in which spheres
- Calculate the forces acting inside of each sphere
  - Calculation the Forces acting between one star and the rest

Extrapolation

- Calculate where the stars are next

Generating an evenly distributed point-cloud

- numpy

Random Sampling

- Generate a random value in a range $[r_{min}; r_{max}]$
- Find out if the value is bigger or smaller than the NFW value

The NFW-Profile

- Returns a probability for a star to get generated

[insert nfw-distance function image]

Using the .csv file format

- How do I use the csv format?

Generating a grid for subdividing the galaxy

- insert grid image without the spheres
- problem (threshold)

Generating the spheres on the vertices of the grid

$$r = \sqrt{1^2 + 1^2 + 1^2} \tag{1}$$

- insert grid image with the spheres
- problem (threshold)

Which Star is in which sphere?

- Method for finding this out

Forces acting in each sphere

- cycle through all the stars in each sphere and calculate the forces

Calculate the forces acting inbetween the individual stars and the other stars

- DO EPIC THINGS!

Where are the stars after n seconds?

- Force acting on star for n seconds equals a displacement of m