$PHYS141_A ssignment1_E xplanations$

Yuntong Zhou

February 2022

1 Problem 1

1.1

The c code to generate Plummer sphere is 'problem1a.c', and the dat file generated is called '1a.dat'. I defined a new mass unit so that G can be kept as one. However, that seems to lead to unexpected problem, which will be stated in part c.

1.2

The python code to generate part b and part c histograms is 'plot.py'. The histogram for part b is 'mass$_d istr.png'.Thehistogram(failed)forpartcis'energy_d istr.png'$.

1.3

The failed energy distribution casts doubts on the scaling method for velocity. Therefore, another dat file 'backup.dat' is generated which keeps G, M, R all at 1. The corresponding c code is 'problem1c.c'. The generated plot 'energy$_d istr_b ack_u p.png'alsofailedtodemonstratetheexpectedrelationship$.