



# Assignment

Write from scratch a computer code to integrate numerically the time evolution of Newtonian  $N$ -body system for given initial conditions.

- The “stars” of the system are *point-like* and have masses over a range  $m_{min} \leq m \leq m_{max}$ , distributed according a given IMF,  $\varphi(m)$  ;
- the total mass would be  $M = N \langle m \rangle$ , where  $\langle m \rangle$  is the average mass, as coming from  $\varphi(m)$ :  $\langle m \rangle = \frac{\int_0^{\infty} \varphi(m) m dm}{N}$  ;
- initial conditions for positions and velocities  $(\mathbf{r}_{i0}, \mathbf{v}_{i0})$  must be sampled by chosen *spatial* and *velocity* distributions in spherical symmetry;
- in a second step, an external gravitational potential should be included.

**Important: DISCUSS and INTERPRET RESULTS!**