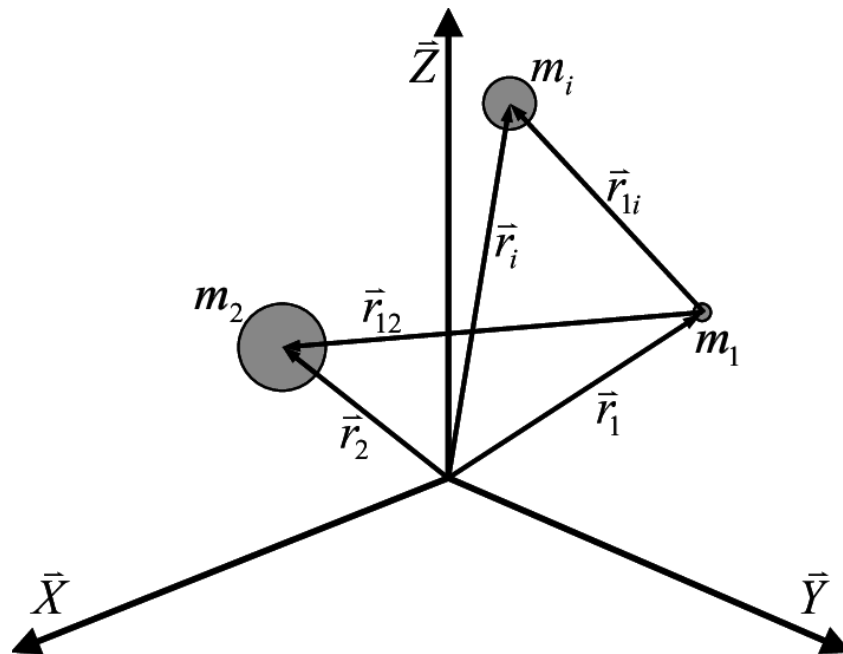


## The N-Body Problem



Objective:

Parallelize a particle simulation code. Possible steps

- 1) Write a scalar version [1]
- 2) Write a parallel version following the indication in [1]

**More complex steps (may lead to an exam project)**

- 3) Implement parallel multipole algorithms:
  - Barnes and Hut [3] (sections 1,2,3)
  - Fast multipole [3] (sections 1,2,4)

You may choose between MPI or an OpenMP implementation.

References

- [1] Chapter 7 of Pacheco Book
- [2] <https://sites.google.com/lbl.gov/cs267-spr2022/hw-2-1?authuser=0!!broken!!>
- [3] FMMsimple.pdf
- [4] NumericalSolNBody.pdf

Extra suggestions:

- try to write a single code for the 2D and 3D case
- try to make it generic with respect to the expression of the inter-particle forces