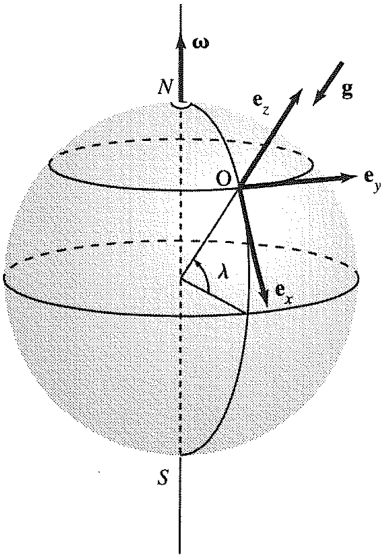
CLASSICAL PHYSICS TFY 4345 – COMPUTATIONAL EXERCISE 3

This is the third compulsory exercise and only a small amendment to the second one. Please return them both together as a single report by November 12th at 13:00 in Blackboard. There is no need to return the computational exercise 2 before that time! (Sorry for any confusion.)

Assessment, computational exercises 2 and 3: Accepted (1) or requires a revision (0)

3. Paris Gun and the Coriolis correction



Expand your code such that you can shoot in any direction from Crépy (origin, 49°36'18"N 3°30'53"E). The user is supposed to provide the coordinates (note: within the shooting range) and the program computes the required shooting angle and azimuth.

Initial conditions: The same as before.

Air drag model: The same as before.

Air density corrections: The same as before.

Include an automatic correction routine in your code which will calculate the required corrections in the shooting angle and azimuth to hit the target accurately.

4. Optional improvements (not compulsory!)

- Modify your code such that the shooting can take place anywhere on the globe.
- Take into account the changing direction of the gravitational force.
- Include also the centripetal force via the triple vector cross-product.

At this point, the most obvious missing contribution would be the lift effect caused by air on the muzzle (coupled to drag), but we have no good approximation for that contribution.