7. Coriolis force

13. November 2025

Problem 1.
Evaluate how approximately the trajectory of a projectile shot to the east in the northern hemisphere changes due to the Coriolis effect. Assume that the distance covered by the projectile is small compared to the Earth radius. Use the Cartesian system with the axis x pointing to the east, y to the north and z upward. Consider the approximation with the forces computed from the velocity of the original parabolic trajectory only (without effects of the Coriolis force).

Problem 2.
Find the Coriolis force acting on an air particle moving in Prague (50°N, 14°E) with the velocity with northward and eastward component, both 10 m/s. Evaluate the size of *all* terms. Does it make sense to omit some terms?

Problem 3.
Check the validity of the phrase "apple doesn't fall far from the tree" for an apple tree at the equator after considering the Coriolis force. Consider that the apple falls from the height $h = 4$ m. Neglect the air resistance as well as the effect of the horizontal velocity caused by the Coriolis force.