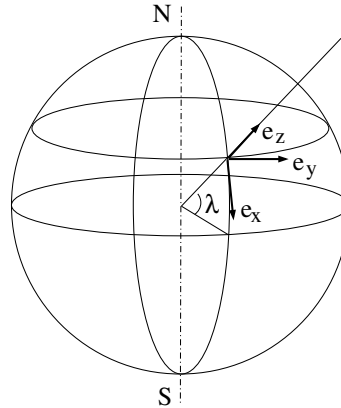


[mex62] Effects of Coriolis force on an object projected vertically up

A particle of mass m is projected vertically up from a point on the Earth's surface at northern latitude λ . (a) Find the deflection (x_1, y_1) of the path from the vertical at $z_1 = h$, where the particle reaches its maximum height. Use the local frame of reference with the origin at the launch site and the axes as shown. Express the result as a function of λ (angle of latitude), ω (angular frequency of Earth's rotation), g (acceleration due to gravity), and h (maximum height reached by particle). Keep only terms up to linear order in ω . (b) Find the deflection (x_2, y_2) of the path at $z_2 = 0$, when the particle strikes the ground.



Solution: