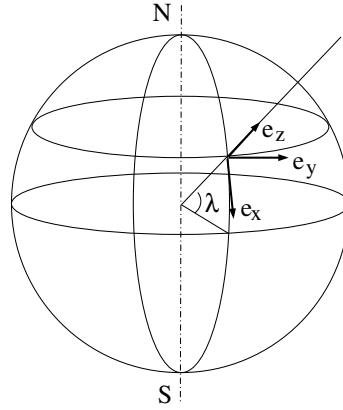# [mex65] Lateral deflection of projectile due to Coriolis force

Consider a location at northern latitude $\lambda$ on the Earth's surface. A particle is projected due east with initial speed $v_0$ and angle of inclination $\alpha$ above the horizontal. Find the lateral deflection $d_x$ due to the Coriolis force of the point where the particle strikes the ground. Perform the calculation to leading order in $\omega$, the angular frequency of the Earth's rotation. Express $d_x$ as a function of $v_0, g, \alpha, \lambda, \omega$. Evaluate the range $R$ (to zeroth order in $\omega$) and the lateral deflection $d_x$ (to first order in $\omega$) for the case where a projectile is launched with speed $v_0 = 100$m/s at angle $\alpha = 45°$.



**Solution:**