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# Hw 7

$K_G = \frac{1}{2} m v^2 = 10\,MeV$

proton $q = +1e$

$X_0 = 2R_G$ $\quad B_0 = 3 \cdot 10^5\,T$

$m \frac{dV}{dt} = q\, V \times B$ $\quad B = \frac{B_0}{(r/R_G)^3}(2\cos\theta\,\hat{r} + \sin\theta\,\hat{\theta})$

Since particle will always be in x, y

$\theta = 90$

$B = -\frac{B_0}{(r/R_E)^3}\hat{k}$

$y_{k+1} = y_k + \frac{h}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

$\frac{V_1 - V_0}{h} = \frac{q}{m} V \times B$ $\quad V_1 = \frac{qh}{m} V_0 \times B + V_0$

$r = \sin\theta\cos\phi\,\hat{i} + \sin\theta\sin\phi\,\hat{j} + \cos\theta\,\hat{k}$

$r = \cos\phi\,\hat{i} + \sin\phi\,\hat{j}$

From last week first step

$V = \langle V_0, -V_{0x} \cdot B_{0z}, 0 \rangle$ this instantly violates conservation of kinetic energy.

→ I think I have problem setup incorrectly can retry solution when have Hw 6 solutions.