

$$3) \int_C F \cdot d\alpha \rightarrow \int_S dS \cdot (\vec{\nabla} \alpha F)$$

$$F(x, y, z) = (y, z, \alpha)$$

$$\alpha(u, v) = (\cos(u), \sin(u), v)$$

$$\nabla \alpha F = (-1, -1, -1)$$

$$dS = \left( \frac{\partial \alpha}{\partial u} \times \frac{\partial \alpha}{\partial v} \right) du dv$$

$$(\cos(u), \sin(u), 0) du dv$$

$$\int_0^{2\pi} \int_0^{\pi/4} dS \cdot (\vec{\nabla} \alpha F) = -2 - \frac{\pi}{2}$$

moment direction!  
 $\vec{p}_m$  is not mag axis!