

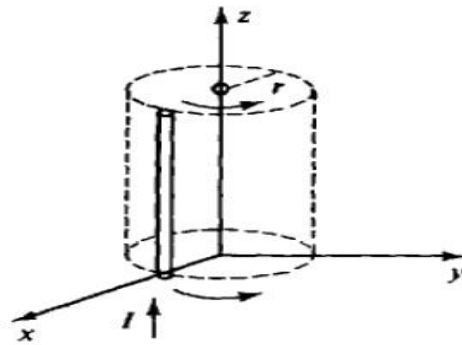
Lab9 (18/3/16)

Question.1

Write a MATLAB program to determine \vec{H} using Ampere's law in the region $0 < r < 0.5\text{m}$, in cylindrical coordinates, the current density is $\vec{J}=4.5e^{-2r}\hat{z}$ (A/m²) and $\vec{J}=0$ elsewhere.

Question.2

Write a MATLAB user defined program to find work and power required to move conductor shown below figure one full turn in the positive direction at a rotational frequency of N revolutions per minute, if $\vec{B} = B_0\hat{r}$ (B_0 a positive constant).



Verify your answer for two sets of input data.

Question.3(HA)

Let $\vec{J}=400 \sin\theta/(r^2+4)\hat{r}$ A/m². Find the total current flowing through that portion of the spherical surface $r = 0.8$, bounded by $0.1\pi < \theta < 0.3\pi$, and $0 < \phi < 2\pi$. Verify your answer using a MATLAB program.

Question.4

Write a MATLAB program to find the flux crossing the portion of the plane $\phi = \frac{\pi}{4}$ defined by $.01 < r < .05\text{m}$ and $0 < z < 2\text{m}$. A current filament of 2.50A along the z-axis is in the \hat{z} direction.