

Lecture 38: Review

ECE221: Electric and Magnetic Fields

Prof. Sean V. Hum

Winter 2019



Outline

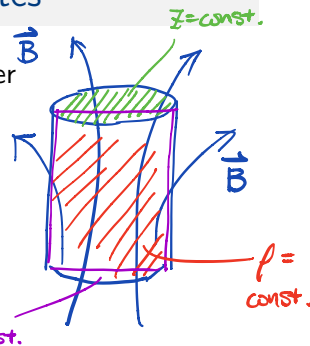
- 1 Flux Linkage Integrals
- 2 Midterms
- 3 End

Flux Linkage Integrals: Cylindrical Coordinates

If the flux density \mathbf{B} passes through the top of a cylinder ($z = \text{constant}$)...

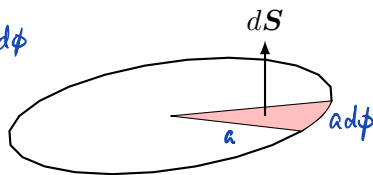
$$\psi = \iint_S \vec{B} \cdot d\mathbf{S} = \iint_S B_z \rho \, d\rho \, d\phi$$

$$d\mathbf{S} = \rho \, d\rho \, d\phi \, \hat{\mathbf{z}}$$

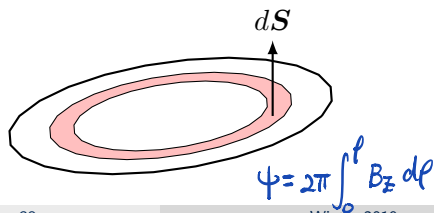


...and the density does not vary with ρ :

$$\psi = \int_0^{2\pi} B_z a^2 \, d\phi$$



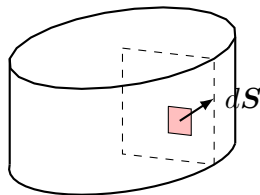
...and the density does not vary with ϕ :



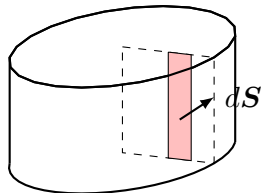
Flux Linkage Integrals: Cylindrical Coordinates

If the flux density \mathbf{B} passes through the ~~side~~ ^{internal} of a cylinder
 ($\phi = \text{constant}$)...

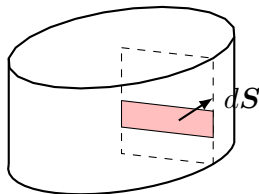
ϕ



...and the density does not vary
with z :

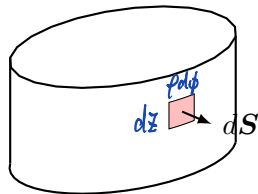


...and the density does not vary
with ρ :

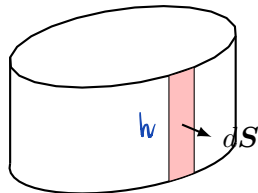


Flux Linkage Integrals: Cylindrical Coordinates

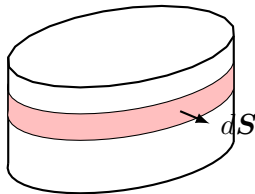
If the flux density \mathbf{B} passes through an ~~internal~~ ^{side} plane of a cylinder
 ($\rho = \text{constant}$)...



...and the density does not vary with z :



...and the density does not vary with ρ :



Difficult Midterm Problems

- ① Midterm 1 Problem 3
- ② Midterm 2 Problem 3

Please fill out your course
evaluations before April 12!
<http://uoft.me/openevals>

Review session / office hours
Wednesday, April 24?

Ask me anything!
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