

Assignment 1

Physics 321
Electrodynamics I

Due on Friday, September 6th, 2024

Class date: September 4th, 2024.

Reading: pp. 1–9, a review of vector definitions.

Problem 1

Griffiths 1.2 – Associativity and the cross product.

Problem 2

Griffiths 1.4 – Finding a unit normal with the cross product.

Problem 3

For \mathbf{B} and \mathbf{C} lying in the xy plane, with \mathbf{A} arbitrary, prove that

$$\mathbf{A} \times (\mathbf{B} \times \mathbf{C}) = \mathbf{B}(\mathbf{A} \cdot \mathbf{C}) - \mathbf{C}(\mathbf{A} \cdot \mathbf{B}),$$

the “BAC-CAB” rule (this rule is true for any vectors \mathbf{A} , \mathbf{B} and \mathbf{C} , it’s just easier to carry out the proof for co-planar \mathbf{B} and \mathbf{C}). Use “brute force” and show that the two sides are equal, we’ll see another way to do this quickly (and more generally) later on.

Problem 4

What is the angle between the vectors \mathbf{A} and \mathbf{B} if $\mathbf{A} = 3\hat{x} - 2\hat{y} + \hat{z}$ and $\mathbf{B} = 2\hat{x} + \hat{y} - 2\hat{z}$?