Electromagnetic waves

Lecture 1

Vector Analysis and Vector Algebra

By

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1- Vector Analysis and Vector Algebra

1-1 Vector is a quantity having both magnitude and direction such as displacement, velocity, force and acceleration.

> Example 1
> Write the vector for each of the following:
> a. of the vector $(1, -3, -5)$ to $(2, -7, 0)$.
> b . of the vector $(2, -7, 0)$ to $) 1, -3, -5)$.
> c . The location vector to $(4, 90.(-.)$
> solution
> $a\langle -1, 4, -5\rangle$ $b\langle 1, -4, 5\rangle$
> The two vectors in a and b are different in sign only, and this shows that they have the same magnitude, but they are opposite
> direction.
> $c\langle -90, 4\rangle$

1-2 Vector Algebra

Laws of vector algebra. If A, B and C are vectors and m and n are scalars, then

1. A+ B = B + A Commutative Law for Addition
2. A+ (B+C) = (A+B) + C Associative Law for Addition
3. mA = Am Commutative Law for Multiplication
4. m (nA) = (mn) A Associative Law for Multiplication
5. (m+ n) A = mA + nA Distributive Law
6. m (A+ B) = mA + mB Distributive Law