CHAPTER OVERVIEW

1: Preliminary Concepts

A field is the continuum of values of a quantity as a function of position and time. The quantity that the field describes may be a scalar or a vector, and the scalar part may be either real- or complex-valued. In electromagnetics, the electric field intensity $\mathbf{E}$ is a real-valued vector field that may vary as a function of position and time, and so might be indicated as "$\mathbf{E}(x, y, z, t)$," "$\mathbf{E}(\mathbf{r}, t)$," or simply "$\mathbf{E}$." When expressed as a phasor, this quantity is complex-valued but exhibits no time dependence, so we might say instead "$\widetilde{\mathbf{E}}(\mathbf{r})$" or simply "$\widetilde{\mathbf{E}}$." An example of a scalar field in electromagnetics is the electric potential, V; i.e., $V(\mathbf{r}, t)$. A *wave* is a time-varying field that continues to exist in the absence of the source that created it and is therefore able to transport energy.

Thumbnail: Examples of phasors, displayed here as points in the real-imaginary plane.

Contributors and Attributions

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