

“Green’s theorem in electromagnetic field theory”, pp.141-146

Karl F. Warnick and Peter Russer

Abstract – Green’s theorems are commonly viewed as integral identities, but they can also be formulated within a more general operator theoretic framework. The radiation integral for fields in terms of a source and Green’s function can be derived in this way. We show that Green’s theorem can also be used to obtain conservation of energy, the uniqueness, reciprocity, and extinction theorems, Huygen’s principle, and a condition satisfied by fields and sources in a lossless, nonradiating system which parallels the definition of reciprocity. Both three-dimensional and two-dimensional problems are considered.