



ΕΡΕΥΝΗΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ ΚΑΙ ΧΗΜΙΚΩΝ ΔΙΕΡΓΑΣΙΩΝ ΥΨΗΛΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ

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ΣΕΜΙΝΑΡΙΟ

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ΘΕΜΑ: **VOLTERRA DIFFERENTIAL CONSTITUTIVE OPERATORS
AND LOCALITY CONSIDERATIONS IN ELECTROMAGNETIC
THEORY**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ

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ΠΕΡΙΛΗΨΗ

Macroscopic Maxwell's theory for electrodynamics is an indeterminate set of coupled, vector, partial differential equations. This infrastructure requires the supplement of constitutive equations. Recently a general framework has been suggested, taking into account dispersion, inhomogeneity and nonlinearity, in which the constitutive equations are posited as differential equations involving the differential operators based on the Volterra functional series. The validity of such representations needs to be examined. Here it is shown that for such representations to be effective, the spatiotemporal functions associated with the Volterra differential operators must be highly localized, or equivalently, widely extended in the transform space. This is achieved by exploiting the Delta-function expansions, leading in a natural way to polynomial differential operators. The Four-vector Minkowski space is used throughout, facilitating general results and compact notation.