

FAKULTÄT FÜR ELEKTROTECHNIK UND INFORMATIONSTECHNIK

INSTITUT FÜR INFORMATIONSTECHNIK

INSTITUTSKOLLOQUIUM (Raumänderung)

Am Mittwoch, dem 9.12.2015, spricht um 13:15 im **Sr BI 1130 (Bionikgebäude)**

Prof. Dragan Poljak

University of Split

Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Split, Croatia

Stochastic-Deterministic Modeling in Electromagnetics: Application to Ground Penetrating Radar and High Frequency Dosimetry

The presentation deals with an analysis of Ground Penetrating Radar (GPR) antenna system and the exposure of the brain and eye to the HF radiation on the basis of deterministic and stochastic modeling thus taking into account the uncertainty variations of input parameters.

Many recent studies have shown the importance of environmental variations for GPR operation and this presentation aims to give an outline of the computational tool to assess statistical margins to improve GPR practical use. Deterministic model is based on the space-time integral equation of the Hallen type and related integral expressions for the reflected/transmitted fields in two media configuration.

The presentation also deals with the influence of the variability in the morphology and the tissue properties of the brain and eye, respectively to the induced Specific Absorption Rate (SAR) due to the exposure to high frequency (HF) radiation. Stochastic-deterministic modeling provides a satisfactory theoretical basis for estimating the effects of the related uncertainties on the maximum induced local and average SAR, respectively. An efficient Method of Moments (MoM) scheme applied to the brain exposure and hybrid boundary element method (BEM)/finite element method (FEM) used to handle the eye exposure are considered.

A simple stochastic collocation (SC) formalism is then used to accurately account for uncertainties and to assess confidence intervals in the set of obtained numerical results.

The expansion of statistical output in terms of mean and variance over a polynomial basis (via SC) is shown to be robust and efficient technique providing a satisfactory convergence rate of SC technique.

Various illustrative examples will be presented throughout the presentation.

Die Hochschullehrer des Instituts für Informationstechnik laden Sie herzlich dazu ein.

Ilmenau, den 17.11.2015