



FOR NOTICE BOARD

INSTITUTE COLLOQUIUM

INDIAN INSTITUTE OF SCIENCE
BANGALORE

PROF. N BALAKRISHNAN
Supercomputer Education & Research Centre

will deliver a lecture

on

Computational Challenges in Electromagnetics

On Tuesday, the 2 April 2002
at 4.00 PM in the Faculty Hall.

THE DIRECTOR

will preside.

All are cordially invited.

Coffee/Tea: 5.00 PM
Reception Hall

Prof. S S Krishnamurthy
Convener

ABSTRACT

Numerical solution of Maxwell's equations has been stimulated by the disruptive changes that we had witnessed in the growth of computing power and the speed of networks. This in effect has resulted in the Computational Electromagnetic Techniques being applied to a variety of problems that span from the scattering from rain drops to complex shaped bodies such as an aircraft. Simultaneously, a wide spectrum of techniques has also evolved in order to deal with the complexity in shape and the material characteristics of the scatterer. The techniques in Computational Electromagnetics (CEM) are broadly classified as rigorous methods that solve the Maxwell's equations in its Differential or Integral forms such as the Method of Moments (MoM), Finite Difference Time Domain (FDTD), Finite Element Method (FEM) etc. and those that solve the Maxwell's equation in its asymptotic form such as Geometric Theory of Diffraction and Uniform Theory of Diffraction. Associated with the differential equation formulations are also the innovative techniques needed for the termination of the boundary in a computationally efficient way.

In this talk, we present an over view of the variety of the CEM techniques and give illustrative examples from the real world including the Radar Cross Section estimation of aircraft, quantification of rain and hail using a polarimetric radar and the target identification. We also present the computational efforts required for solving such complex problems. The computational challenges that CEM techniques pose today to solve many of the real world problems in the required time and the trends in supercomputing are also given in brief.