Proposal for Mini-symposium as part of IACM-ECCOMAS08:

Dan Givoli, Dept. of Aerospace Engineering, Technion, Haifa, Israel
Geza Seriani, Dept. of Geophysics of the Lithosphere, OGS, Trieste, Italy

Advanced Computational Methods for Wave Motion

Wave motion is common to many fields of application, such as acoustics, oil exploration, earthquake engineering, electromagnetism, weather prediction, oceanography, and others. Computational methods for wave propagation are essential in all of these fields. Despite the fact that different physical wave phenomena are associated with the various disciplines, a lot of the characteristics of wave problems and numerical methods are shared among the different areas. In recent years there is an increased interest in advanced computational methods for wave problems which cross the borders of specific applications. Important issues where progress has been made recently include (1) multiscale wave phenomena that require special solution techniques to resolve the various scales, (2) special finite element methods based on space enrichment for short waves, (3) high-order absorbing boundary conditions and PMLs for wave propagation in unbounded domains, (4) high-order methods for dealing with inhomogeneous anisotropic media with fast variation of the material properties, (5) inverse problems based on wave scattering, (6) high-order stable and robust methods for time integration. This mini-symposium will address these and other related issues, while concentrating on time-dependent problems (as opposed to stationary wave problems) which are believed to pose great challenges in computational mechanics.