Applied Mathematics Seminar Series

Wednesday, Mar. 21, 2011,
11:00am - 12:00pm, ETV-131

Integral Absorbing Boundary Conditions in the Time Domain

Prof. Francisco-Javier Sayas
Department of Mathematical Sciences
University of Delaware

Abstract: Absorbing or transparent boundary conditions for transient waves can be accomplished in several ways, with Perfectly Matched Layers, with Surface Differential Operators or with Boundary Integral Equations. This last possibility (which is very well understood and quite widely employed in the frequency domain) has several advantages: no need of convexity for the cut-off boundary, possibility of having separate boundaries that transport information among computational domains as well as arbitrary proximity to sources, non-homogeneities, etc. In this talk I will show how to construct the simplest integral absorbing boundary condition for the acoustic wave equation and will give some pointers on its properties: unconditional stability after space-Galerkin discretization, energy conservation and possibility of time-stepping with convolution quadrature. I will also explain the challenges that time domain boundary integral equations have to overcome in the near future.

Dr. Francisco-Javier Sayas got his Ph.D. in Mathematics from Universidad de Zaragona, Spain. He was an associate professor at the Department of Applied Mathematics, Polytechnic Center, Universidad de Zaragona, Spain and visiting associate professor at University of Minnesota. Currently, he is an associate professor at the Department of Mathematical Sciences, University of Delaware. He has over sixty publications in refereed journals and his research deals with Numerical Analysis and Scientific Computing including Boundary element methods and their applications, Coupling and overlapping of Boundary and Finite Element Methods, etc.

Want to suggest a speaker? Send email to Dr. Jiguang Sun at jsun@desu.edu