THE DISCRETE NON LOCAL (DNL) RADIATION BOUNDARY CONDITION

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ABSTRACT

A general methodology for developing absorbing boundary conditions is presented [1,10,11]. In the plane case, it is based on a straightforward solution of the system of ODE's that arise from partial discretization in the directions transversal to the artificial boundary. T s leads to an eigenvalue problem of the size of the number of degrees of fr dom in the lateral discretization. The eigenvalues are classified as in-goin or right-going and the absorbing boundary condition consists in imposing null value for the in-going modes, leaving free the right-going ones. Wher s the classification is straightforward for operators with definite sign, like the Laplace operator, a *"virtual dissipative"* mechanism has to be added in the mixed case, usually associated with wave propagation phenomena, like the Helmholtz equation, or potential flow with free-surface (the *"wave resistance problem"*). Numerical examples are presented in two companion papers at this same conference. [2,8].

1. INTRODUCTION

hen solving PDE's on unbounded domains by *"in volume"* discretization methods e finite elements or finite differences, a fictitious boundary has to be introduced mewhere in order to get a bounded computational domain. For elliptic operators definite sign, like the Laplace operator, enforcing a Dirichlet or Neumann boundary ndition on this artificial boundary leads to a well posed problem that converges to e unbounded domain problem. For mixed operators, generally associated with wave henomena, like the Helmholtz equation or potential flow with a free surface (the wave-esistance problem), the limit process of pushing this artificial boundary to infinity may ot converge, and some sort of absorbing boundary condition has to be imposed on the rtificial boundary.

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