- **NUM-05-003-IP**

The ITS Method: a New Iterative Time Scheme for Solving the Acoustic Wave Equation

Geza Seriani
Istituto Nazionale di Oceanografia a di Geofisica Sperimentale
Borgo Grotta Gigante 42/C, Sgonico
I-34010 Trieste, Italy
Phone: +39-040-21401
Email: gseriani@ogs.trieste.it

The standard approach for computing the fem solution of the acoustic wave equation is based on time-step methods either explicit or implicit. The explicit algorithms can be very efficient, but with a low accuracy. The need of very small time steps, because of the stability constraint on fine meshes, may decrease the performance, and mass matrices must be diagonal. On the contrary, the implicit methods are much more expensive, unconditionally stable and mass matrices need not to be diagonal. In this work a new iterative time-stepping (ITS) technique is proposed which shows some of the best features of both the two methods: accuracy, stability, efficiency and no matrix inversion is needed.