

A numerical study of a non-hydrostatic ocean model: an application to the Mediterranean Sea

Pedro Galán del Sastre ¹

In this work we present a non-hydrostatic ocean model. The set of equations consists of the three dimensional Navier-Stokes equations in a rotating frame together with conservation equations for temperature and salinity. These equations are discretised using the so called Lagrange-Galerkin method combined with the finite element method in a semi-implicit scheme. The main advantages of the resulting numerical scheme is that it allows large time steps, thanks to the good stability properties of the Lagrange-Galerkin method, and we can make use of the finite element unstructured meshes to increase resolution in some specific regions where the flow cannot be under-resolved. Some fully non-hydrostatic examples are shown and finally an application to the Mediterranean Sea.

¹Dept. Matemática Aplicada, E.T.S. de Arquitectura, Univ. Politécnica de Madrid,
e-mail: pedro.galan@upm.es