ON A MIXED METHOD FOR THE OBERBECK-BOUSSINESQ MODEL OF HEAT AND MASS TRANSFER

MARIO ALVAREZ, ELIGIO COLMENARES, AND FILÁNDER SEQUEIRA

Abstract. Natural convection is of paramount interest since it appears in many environmental processes and diverse industrial practical applications. In this talk, I will present a work in progress that extends a previous mixed finite element method for heat driven flows to the more complex and realistic situation in which this phenomena results from bouyancy forces generated not only by temperature differences but also species concentration effects. The model in consideraton is written in the Oberbeck-Boussinesq approximation framework; a system given by the incompressible Navier-Stokes equations, and the advection-difussion equations for describing the underlying hydrodynamic, and the substance concentration and the temperature, respectively. The main features of the approach and the continuous and discrete solvability results obtained so far for the corresponding variational formulation will be presented along with some preliminary numerical experiments suggesting optimal a priori error estimates.

Keywords: mixed finite element method, Oberbeck-Boussinesq equations, a priori error estimates.

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Departmento de Ciencias Naturales, Universidad de Costa Rica, Sede de Occidente, Costa Rica
E-mail address: mario.alvarezguadamuz@ucr.ac.cr

Departamento de Ciencias Básicas, Universidad del Bío-Bío, Campus Fernando May, Chillán, Chile
E-mail address: ecolmenares@ubiobio.cl

Escuela de Matemática, Universidad Nacional, Heredia, Costa Rica
E-mail address: filander.sequeira@una.cr