

# PRESSURE ENRICHMENT FOR BILINEAR QUADRILATERAL FINITE ELEMENTS IN TWO-FLUID FLOW PROBLEMS

MARCELA CRUCHAGA, GUSTAVO BUSCAGLIA, AND RAMON CODINA

ABSTRACT. In fixed mesh finite element formulations for moving interfaces and free surfaces flow, the pressure field exhibits discontinuities along the interface that are poorly described with standard finite element spaces. Different solutions has been proposed in the literature to solve this inconvenient: modification to standard P 1 interpolation [1] or, the most popular, the enrichment of the discrete pressure space (see e.g., [2, 3, 4]).

This work presents enrichment interpolation fuctions in quadrilateral elements able to deal with pressure discontinuities. They are combined with a residual-based stabilized formulation to allow for a static condensation of the added unknowns. The formulation is used to analyse classical hydrostatic pressure test and free-sloshing problems.

**Keywords:** fixed mesh finite element method, pressure enrichment, quadrilateral elements, two-fluid flows

**Mathematics Subject Classifications (2010):** 65N06, 65N12

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DEPARTAMENTO DE INGENIERÍA MECÁNICA - UNIVERSIDAD DE SANTIAGO DE CHILE, AV. BDO. O'HIGGINS 3363 - SANTIAGO DE CHILE - CHILE

*E-mail address:* marcela.cruchaga@usach.cl

INSTITUTO DE CIÊNCIAS MATEMÁTICAS E DE COMPUTAÇÃO - UNIVERSIDADE DE SÃO PAULO, AV. DO TRABALHADOR SOCARLENSE 400 - SÃO CARLOS - SÃO PAULO - BRASIL

*E-mail address:* gustavo.buscaglia@gmail.com

INTERNATIONAL CENTER FOR NUMERICAL METHODS IN ENGINEERING (CIMNE) - UNIVERSITAT POLITECNICA DE CATALUNYA (UPC), JORDI GIRONA 1-3 - BARCELONA - SPAIN

*E-mail address:* ramon.codina@upc.edu.