

DETECTION OF IMMERSSED OBJECTS BY IMAGE PROCESSING AND NUMERICAL SIMULATION WITH EMBEDDED METHOD IN HIGH PERFORMANCE COMPUTING

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Keywords: Embedded method, finite volumes, rigid body mechanics, fluid-structure interaction, ArUco markers.

Abstract. This research project investigates the behavior of rigid objects submerged in water through a combination of numerical simulations and experimental observations. To simulate the interactions between objects and their environment, an embedded technique is implemented using the Code Saturne code and the "prtclsys" C++ library for modeling rigid bodies. Experimental analysis involves image processing techniques to determine the position and orientation of a specific object. Segmentation and detection methods are employed using histograms and binary masks. Camera calibration provides intrinsic parameters, while extrinsic parameters are obtained from ArUco markers. The study focuses on analyzing cases where submerged bodies experience periodic horizontal agitation, with trajectory and rotation data used to validate the proposed numerical model against experimental findings.

Acknowledgements: The authors acknowledges to Fondecyt 1210228, Dicyt 052216C-Ayudante, Chile; Agencia I+D+i-PICT-I-A-2021-0065, CONICET PIP1220200100819CO, Argentina.