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DEVELOPMENT OF A FLUID-STRUCTURE INTERACTION MODEL TO CAPTURE DISPLACEMENTS DURING FLOW THROUGH DEFORMABLE BODIES

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Abstract

With age, the stiffness of human arteries increases. This phenomenon leads to an increase in propagation velocity of pressure waves and an overcompensation on heart's part leading to various medical ailments like left ventricular hypertrophy, elevated blood pressure, strokes and many more. The goal of the *ENTHRAL* project is to develop a non-invasive method to determine an artery's stiffness, so that proper medical treatment can be started before it is too late. Within the project, there is also a need to develop a numerical model that, given initial and boundary conditions, will be able to predict the displacements of the deformable material (which is supposed to be an artificial analogue for the Left Common Carotid Artery, *LCCA*). This is achieved using the Fluid-Structure Interaction approach (*FSI*) that couples the behaviour of fluids (through Computational Fluid Dynamics, *CFD*) and solid bodies (Finite Element Analysis, *FEA*). All analyses are performed within *ANSYS* software package, particularly in *Fluent* (fluid part) and *Mechanical* (solid part). Obtained results are presented and compared to experimental results.

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