



G09.20

**Multifluid Flows, Interface Capturing and Application to the Simulation of the Water Assisted Injection Molding Process**

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In this paper, we present a 3D finite element approach to compute multiphase flows, in particular during the Water Assisted Injection molding (WAIM) process. It has been performed within the Consortium IAE, that has as partners the CETIM (French Industrial and Mechanical Technical Centre), DK (Press Manufacturer), ISPA (Alençon's Plasturgy Institute) and the ISMO (Mold Institute). Polymer's behaviour is supposed non-newtonian, non-isothermal, whereas water is treated as a low viscosity fluid. Pressure, velocity and temperature are obtained through the usual conservation equations in the multiphase form. These equations are solved in the discretized domain (using simplex-based elements) by the mixed finite element method. Special attention is given to capture the water/polymer interface, that can be obtained used a VOF (Volume of Fluid) or a Level Set technique, with or without adaptative meshing. The importance of the thermal transfer between the polymer and the water is also outlined, leading to the solidification's history of the part. Validations are performed using a tubular part, and the influence of the different injection parameters is shown.