

A POD-Neural Network model for a molten glass flow inside a furnace**Authors:**

- Francesco Ballarin, Università Cattolica del Sacro Cuore
(francesco.ballarin@unicatt.it)
- Enrique Delgado Ávila, Universidad de Sevilla (edelgado1@us.es)
- Andrea Mola, IMT School for Advanced Studies
(andrea.mola@imtlucca.it)
- Gianluigi Rozza, Scuola Internazionale Superiori di Studi Avanzati
(grozza@sissa.it)

Abstract: In this work, we present a non-intrusive POD model of a molten glass flow inside of a furnace, based on Artificial Neural Networks. The impossibility of observing the real flow of the molten glass inside of a furnace, makes interesting the construction of a CFD model that could be of big interest for the glass industry. With the CFD simulation, we can better understand how the molten glass behaves, letting the glass industry to optimize the process of glass production. We first present the CFD model, for the molten glass flow, based on industrial data. Moreover, since this model may depend on several parameters, we present a non-intrusive POD model, based on Artificial Neural Networks, that let us to compute numerical solutions for different parameter values in real time. This non-intrusive POD model is constructed for helping the glass industry in the decisions adopted for the quality improvement in the glass production. We present numerical results for both the CFD and the non-intrusive POD model.