A LAGRANGIAN FINITE ELEMENT APPROACH FOR THE SIMULATION OF LARGE-SCALE ENGINEERING PROBLEMS

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Abstract

The removal of material from solid surfaces due to the impingements of solid particles transported by a carrier liquid, referred to as slurry erosion, has been the subject of scientific research for long time. This is certainly a consequence of the serious economic implications of this phenomenon, which is a concern in different applications, such as oil & gas production plants, hydraulic machinery, and pipelines for hydraulic conveying of solids. At the same time, the problem of slurry erosion is particularly intriguing to researchers due to its intrinsic complexity and multi-disciplinary character, at the frontier between fluid and solid mechanics. Owing to the fact that experiments are very costly and difficult-to-perform, in the last two decades there has been an increasingly use of numerical modelling as an approach for slurry erosion prediction. However, despite the significant advancements achieved so far, we are still far from disposing of an effective simulation tool for engineering design of hydraulic equipment in a slurry environment. Nowadays, even computers considered powerful are not able to handle the massive amount of information at multiple scales that characterize slurry erosion problems, and this opens up significant modelling challenges. The present talk discusses basic approaches and currently open issues in the numerical modelling of slurry erosion, which are driving the current research directions; particular emphasis will be given to application examples in the field of industrial hydraulics.

Presentation time

11.50 - 12.05