

FICTITIOUS DOMAIN APPROACH FOR INNOVATION IN INDUSTRY

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ABSTRACT

Among the emerging numerical methods for testing new innovating concepts for industry purpose are the fictitious domain methods. Over the past twenty years, they have been more and more popular for engineering in the industrial context (tyre design, nuclear safety, fluid/structure interaction, ...). The aim of these methods is to disconnect the physical domain from the computation one, in order to easily modified the physical domain boundary or interface, now described as an immersed boundary/interface. The computation domain shape is easy to mesh and the meshing effort is only reported on the immersed boundary/obstacle shape, generally easier to mesh. Mathematic models (Ghost Cells, Cut Cells, CutFEM, Finite Cell Method, Unfitted Finite Elements, Lagrange multiplier, Immersed Boundary Method, Penalized Direct Forcing, ...) bring back the effect of the immersed boundary/interface on the state variable computation. This is very convenient for testing new designs and optimizing their geometrical shapes. Also it provides a smart way to simplify the meshing of the computational domain around complex obstacle geometry.

This Mini-symposium aims to bring together mathematicians and engineers involved in the design of fictitious domain methods, and/or their applications to real world problems.

REFERENCES

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