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Slug Flow Prediction for Subsea Applications Using Dynamic Anisotropic Mesh Optimisation with Tetrahedral Control-Volume Finite Elements[1] CLAIRE HEANEY, LYES KAHOUADJI, LLUIS VIA-ESTREM, ASIRI OBEYSEKARA, PABLO SALINAS, CHRISTOPHER PAIN, OMAR MATAR, Imperial College London — We present a three-dimensional Direct Numerical Simulation of two-phase air-water flow inside complex pipe configurations with very large aspect ratios (Length/Diameter ¿100) for subsea applications. We focus on the challenging slug flow regimes using a dynamically unstructured mesh, which can modify and adapt to the complex air-water interface in order to represent optimally these flows minimising the use of computational resources. The numerical framework consists of a mixed control-volume and finite-element formulation, and a volume-of-fluid method for the interface-capturing based on a compressive control-volume advection method. The resulting slug length and frequency are compared with experimental data for horizontal pipes.

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