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An introductory study on local mesh refinement for fluid interface tracking for steady flows in the context of virtual elements.

For two-phase fluid flows, it is required to refine the mesh around the interface between the two media. Indeed, this type of problem is usually represented by sharp gradient problems with strong discontinuities in the resulting solution. We conducted an introductory work to study the conditions and the implementation of local refinement around the discontinuities in the case of a reaction-diffusion problem and a Stokes problem. Local refinement condition is implemented through a residual-based estimate for capturing the sharp behaviour of the solution.