3D Finite Element Formulation of Nonlinear Partial-slip Condition on Curved Geometries ONKAR SAHNI, FARHAD BEHAFARID, MANE, RPI, LAUREN FOVARGUE, King's College — For many fluid flow problems, the behavior of the fluid at the physical boundaries doesn't adhere to the traditional no-slip condition or perfect-slip law and exhibits a partial slip. This partial-slip behavior can be nonlinear. Additionally for real geometries of interest, physical boundaries are composed of arbitrary 3D curved surfaces. In this study we focus on a finite-element formulation that includes 3D nonlinear partial-slip condition on general curved surfaces. Using this formulation, we perform finite-element analysis of flow problems with such a nonlinear boundary condition. We present convergence studies on canonical problems and also include cases with complex curved surfaces.

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