A NONCONFORMING STREAM VIRTUAL ELEMENT DISCRETIZATION FOR THE NAVIER-STOKES EQUATIONS

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Abstract. In this talk, we develop a Morley-type virtual element method for solving the Navier-Stokes problem in stream-function formulation. A stability and error analysis by employing an enriching operator is developed. More precisely, by employing such operator, we provide new discrete Sobolev embeddings, which allow to establish the well-posedness of the discrete formulation and obtain optimal error bounds in broken H^2-, H^1- and L^2-seminorms, under minimal regularity condition on the weak solution. Some important variables such as the velocity, pressure and vorticity are obtained through postprocessing algorithms from the discrete stream-function. Finally, we report several numerical experiments on different polygonal meshes.

Keywords: nonconforming virtual element methods, Navier-Stokes equations, stream-function form, discrete Sobolev embeddings, optimal error estimates.

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