

1136-65-20

Michael J Neilan* (neilan@pitt.edu), 301 Thackeray Hall, 139 University Place, Pittsburgh, PA 15260, and **Johnny Guzman**. *Inf-sup stable finite elements on barycentric refinements producing divergence-free approximations in arbitrary dimensions.*

We construct several stable finite element pairs for the Stokes problem on barycentric refinements in arbitrary dimensions. A key feature of the spaces is that the divergence maps the discrete velocity space onto the the discrete pressure space; thus, when applied to models of incompressible flows, the pairs yield divergence-free velocity approximations. The key result is a local inf-sup stability that holds for any dimension and for any polynomial degree. With this result, we construct global divergence-free and stable pairs in arbitrary dimension and for any polynomial degree. (Received November 05, 2017)