1154-65-2376 **Jeonghun Lee*** (jeonghun_lee@baylor.edu), Sid Richardson Science Building, One Bear Place #97328, Waco, TX 76798. *A hybridized discontinuous Galerkin method for the Stokes equations with symmetric stress tensor approximation.*

In most hybridized discontinuous Galerkin methods for the Stokes equations, the formulation of first order differential equations which has the gradient of fluid velocity, the fluid velocity, and the fluid pressure as unknowns. However, this formulation uses a pseudo stress tensor instead of physical stress tensor, so it is not physically valid for problems with traction boundary conditions.

In this work we discuss construction and error analysis of a hybridized discontinuous Galerkin method for the Stokes equations which avoids the shortcomings. More specifically, we use a formulation using the symmetric gradient of fluid velocity as one of its unknowns, and the stress tensor is approximated by a symmetric tensor finite element space. As a consequence, we obtain a numerical method with optimal error estimates, such that traction boundary conditions are consistent with physical models and angular momentum is preserved exactly. (Received September 17, 2019)