NUMERICAL ANALYSIS OF STOKES EQUATIONS
WITH IMPROVED LBB DEPENDENCY[*]

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Abstract. We provide a-priori bounds with improved domain dependency for the solution of Stokes equations and the numerical error of an approximation by conforming finite element methods. The domain dependency appears primarily in terms of the LBB-constant L, and several previous works have shown that L degenerates with the aspect ratio of the domain. We explain the LBB dependency of common a-priori bounds on Du and p and improve most of these estimates by avoiding a global inf-sup condition and assuming *locally-balanced flow*, which is in particular satisfied if $g = 0$. In this case, all error bounds on $u - u_h$ and $p - p_h$, except for $\|p - p_h\|_{L^2(\Omega)}$, prove to be completely independent of L.