1096-65-2382 **Fernando Camacho*** (fercamacho@uky.edu) and **Alan Demlow**. *L_2 and pointwise error estimates for FEM for elliptic PDE on surfaces.*

We present a posteriori L_2 and pointwise error estimates for Surface Finite Element Methods for solving the Laplace-Beltrami equation over a C^3 surface Γ. We use and prove approximation properties for the Scott-Zhang interpolant which are valid for broken Sobolev norms, whereas the usual approximation results for Scott-Zhang type interpolants require globally defined Sobolev spaces. Our estimates contain a "classical" Galerkin component and a geometric component depending on Γ. Our studies indicate that the geometric component is of the same order as the Galerkin one and can dominate naturally defined adaptive algorithms. This contrasts with the corresponding a posteriori energy estimates where the geometric component decreases with a higher order than the Galerkin one. We present numerical experiments where the estimators have been used to implement an adaptive SFEM over surfaces with different curvatures. We refine our meshes using newest vertex bisection and observe the appearance of intermediate meshes Γ_h which contain elements that are not transverse to Γ. The existence of such local "kinks" in our mesh does not affect the convergence rates but does cause spikes in the geometric error and estimator as the mesh is refined. (Received September 17, 2013)