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Emily J. Evans* (montu@wpi.edu), Department of Mathematical Sciences, 100 Institute Rd., Worcester, MA. *A Novel Finite Element Meshing Technique Driven by Fractal Koch Curves* Preliminary report.

We present a novel new way of discretizing a square domain based on a fractal Koch curve. This discretization is unusual, in that the shape, quantities, and size of the elements are determined by the Koch generating function. Thus we have a finite element mesh generated by a continuous function. We describe the family of Koch curves this technique is valid for and detail the necessary methodology to create the mesh. We then consider the triangles and quadrilaterals created in the process and provide shape regularity parameters for these elements. Using this information we show that the constant in the error estimate $\|u - u_I\|_{H^1(K)} \leq Ch\|u - u_I\|_{H^2(K)}$, is *independent* of the choice of n . Finally we will consider the case of singularities and introduce a weighted space. We will then calculate the constant in that case. (Received March 09, 2009)