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Childress P Scot* (10goto10@math.ucr.edu), University of California at Riverside, Riverside, CA 92507. *Fractal Strings, Complex Dimensions, and Adelic Structures.*

We present a generalization of the notion of a Fractal Membrane as introduced by Michel Lapidus in his study of fractal strings and complex dimensions (See “In Search of the Riemann Zeros,” AMS, 2008). Fractal Membranes are a versatile tool for (among other things) attaching a notion of ‘prime’ and ‘arithmetic’ to the lengths of a fractal string. In this talk, we will outline the necessary background for, and sketch the construction of, what we refer to as “adelic structures.” We will show how these structures allow us to attach a similar notion of prime and sense of arithmetic to not just the lengths of a fractal string, but also to its frequencies and complex dimensions. (Received September 15, 2009)