1014-37-153   **Michel L. Lapidus** and **Erin P. J. Pearse*** (`epearse@math.ucr.edu`), Mathematics Dept., University of California, Riverside, CA 92521-0135. *Self-similar systems and complex dimensions.* Preliminary report.

We study self-similar sets by focusing on the iterated function system which defines them. We use the system to produce a tiling of the complement of the original set, consisting of simple tiles. Using measures defined in terms of these tiles, we obtain zeta functions for the tiling which gives the complex dimensions of the original set and reveals its measurability properties. Additionally, we obtain a tube formula for the tiling which yields precise asymptotic expansions for the geometric or spectral counting functions. This extends previous work on Fractal Geometry and Number Theory in 1 dimension (by Lapidus and van Frankenhuijsen) to higher dimensions, and exposes connections to geometric measure theory in the process. (Received August 03, 2005)