1087-60-151 **James Keesling*** (kees@ufl.edu), Department of Mathematics, University of Florida, P.O. Box 118105, Gainesville, FL 32611-8105, and **Jo Ann Lee** (joann5@ufl.edu), Department of Mathematics, P.O. Box 118105, University of Florida, Gainesville, FL 32611-8105. *Estimating Fractal Dimension Using the Ripley $k-$Function.* Preliminary report.

The Ripley $k-$function is used to study the distribution of random points in a planar area or in three space. If the points are distributed by a Poisson process, then they tend to cluster around a line. The formal function is given by

$$K_n(h) = \sqrt[n]{\sum_{i=1}^{m} \sum_{j \neq i} \frac{I_h(i,j)}{m \cdot (m-1)}}$$

.

The function $I_h(i,j)$ is 1 if $d(x_i, x_j) < h$ and is 0 if $d(x_i, x_j) \geq h$ where the random points are $\{x_i\}_{i=1}^m$. The n in the formula is given by $n = 2$ if the points are in a planar area or $n = 3$ if in a three-dimensional area.

Suppose that the points are distributed randomly based on Hausdorff measure on a self-similar fractal. Would some analysis similar to the Ripley $k-$function apply in this case? We can show that such a random set of points can be used to give a reliable estimate of the Hausdorff dimension of the self-similar fractal. We will explain the theory and demonstrate its implementation. We will also discuss applications of the theory. (Received December 03, 2012)