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**Mohammed Yahdi\*** (myahdi@ursinus.edu), Ursinus College, Depart of Math & Compter Science, PO. Box 1000, Collegeville, PA 19426. *Distribution of the Zeros of the Zeta Function using Descriptive Set Theory*. Preliminary report.

The objective of this work is to study the “Topological Complexity” of the set of zeros of the Riemann zeta function using techniques from “Descriptive Set Theory. The argument equivalent to the Riemann Hypothesis, using the function  $\Lambda(s)$  defined on the complex plane as the asymptotic convergence degree of the Riemann sums  $\{S_N(s)\}_N$  of the integral  $\int_0^1 \frac{1}{x^s} dx$ , is introduced and simplified. In particular, the Riemann Hypothesis is shown to be linked to the continuity of the supremum function on a space of subsets  $E_s$  of the real line equipped with the Hausdorff topology. Descriptive set Theory techniques are then applied to measure the topological complexity of the subsets  $E_s$  in order to determine the complexity of the distribution of the zeros of the zeta function. (Received August 27, 2005)