Generalizing Riemann: from the $L$-functions to the Birch/Swinnerton-Dyer conjecture

David F. Haight *
Department of Philosophy
Plymouth State University
Plymouth, New Hampshire 03264
U.S.A.

Abstract
To prove: that the generalized Riemann hypothesis is true, namely, that all the zeta zeros of $L$-functions are balanced on the one-half number line, using the scale of the harmonic zeta function. Now that the Riemann hypothesis has been proven (in “Summa Characteristica and the Riemann Hypothesis: Scaling Riemann’s Mountain”, Journal of Interdisciplinary Mathematics, Vol. 11 (6) (December 2008)), it can be extended by analytical continuation to prove the generalized hypothesis concerning $L$-functions. The initial “gene” or generating (one half) principle that proves the Riemann hypothesis also proves that no $L$-series has a zero with real part on the complex plane other than one half. As a result of this proof, the Birch/Swinnerton-Dyer conjecture is also resolved. Finally, what impact, if any, do these proofs have on security codes based upon prime numbers?

Keywords and phrases: Riemann hypothesis, harmonic zeta function, harmonic mean/gene, Farey/Cauchy mediant, Dirichlet $L$-functions, Euler’s/Riemann’s product, non-trivial zeta zeros, Birch/Swinnerton-Dyer conjecture.

1. Introduction
The Riemann Hypothesis is not just a problem. It is the problem. It is the most important problem in pure mathematics. It's an indication of...