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Riemann Zeta Function.*

Two fundamental discoveries will be presented in this paper.

First, for all values of the parameter  $\sigma$  symmetric about the central value  $\sigma = 1/2$ , it has been found both numerically and analytically that the Magnitude of Zeta is the same, to within an easily computable scale factor, for all values of  $\sigma$  and  $1 - \sigma$  ( which are automatically symmetric about  $1/2$  ).

Second, by simple partial differentiation with respect to the two independent variables  $\sigma$  and  $t$ , it is found that every term in the infinite sum for Zeta satisfies an Undamped Quartic Oscillator PDE. Furthermore, it is found that all infinitely differentiable complex analytic functions (I.e., NOT power series) satisfy a fourth order PDE representing a Damped Oscillator. Two examples are  $\Gamma(s)$  and the Riemann Companion Function  $\Xi(s)$ , where  $s = \sigma + it$ . (Received September 16, 2012)