A Zeta Function for Juggling Sequences

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Published in the Journal of Combinatorics and Number Theory:

Abstract: We give a new generalization of the Riemann zeta function to the set of $b$-ball juggling sequences. We develop several properties of this zeta function, noting among other things that it is rational in $b^{-s}$. We provide a meromorphic continuation of the juggling zeta function to the entire complex plane (except for a countable set of singularities) and completely enumerate its zeroes. For most values of $b$, we are able to show that the zeroes of the $b$-ball zeta function are located within a critical strip, which is closely analogous to that of the Riemann zeta function.

2010 Mathematics Subject Classification: Primary 11M41, 11N80; Secondary 30B40, 30B50.

Keywords: Zeta function, Siteswap, Juggling, Dirichlet Series.