

Revising Type-2 Computation and Degrees of Discontinuity

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By the sometimes so-called *Main Theorem* of Recursive Analysis, every computable real function is necessarily continuous. Weihrauch and Zheng (TCS 2000), Brattka (MLQ 2005), and Ziegler (ToCS 2006) have considered different relaxed notions of computability to cover also discontinuous functions. The present work compares and unifies these approaches. This is based on the concept of the *jump* of a representation: both a TTE-counterpart to the well known recursion-theoretic jump on Kleene's Arithmetical Hierarchy of hypercomputation: and a formalization of revising computation in the sense of Shoenfield.

We also consider Markov and Banach/Mazur oracle-computation of discontinuous functions and characterize the computational power of Type-2 nondeterminism to coincide with the first level of the Analytical Hierarchy.