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Damir D Dzhafarov* (damir@math.uconn.edu), CT. *First-order parts of Weihrauch problems.*

The Weihrauch degrees represent degrees of unsolvability of various mathematical problems. Their study has been widely applied in computable analysis, complexity theory, and more recently, also computable combinatorics. For problems expressible as Π_2^1 principles of second-order arithmetic, the Weihrauch analysis largely extends the traditional framework of reverse mathematics, providing a more refined picture of a problem's second-order strength. We introduce the concept of the first-order part of a Weihrauch degree that seeks to similarly refine a problem's first-order strength. We classify, and obtain bounds on, the first-order part of many natural problems, and show that this gives rise to a hierarchy of principles that roughly corresponds to the Kirby-Paris hierarchy of first-order arithmetic. This is joint work with Reed Solomon and Keita Yokoyama. (Received July 14, 2019)