

# A tutorial on Weihrauch reducibility

Arno Pauly

Clare College

University of Cambridge, United Kingdom

`Arno.Pauly@cl.cam.ac.uk`

Weihrauch reducibility was proposed by BRATTKA and GHERARDI as a conceptual tool to compare the computational content of mathematical theorems. This yields a picture reminiscent of both reverse mathematics and Brouwerian counterexamples, yet offers a finer view (and some subtle differences). While quite a few have been classified with Weihrauch reducibility, there are also many open questions.

As a second fundamental aspect, the Weihrauch degrees exhibit a complex algebraic structure, which has many features of a substructural logic. There is a close interaction between the algebraic structure and both classification statements as well as techniques to prove separation results for Weihrauch degrees.

Besides presenting these two main parts of the theory of Weihrauch degrees, the tutorial will also discuss the precise choice of definitions (and rejected alternatives), as well as proof techniques applicable to Weihrauch reducibility.