

ANALYSIS USING RELATIVE INFINITESIMALS

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To teach analysis rigorously at the elementary level is a challenging task. On the one hand, the epsilon-delta method is technically difficult and not very intuitive. On the other hand, a rigorous use of infinitesimals following traditional nonstandard approaches based on ultrapowers or superstructures seems technically just as difficult, while a naive or “historic” use of infinitesimals leads to contradictory situations [1]. Following Hrbacek’s initial suggestion to use relative infinitesimals [2], Hrbacek, Lessmann and I have now completed a course in analysis based on these ideas [3]. In this talk, I will try to demonstrate how this approach fulfils our hopes of making it a tool to teach elementary analysis rigorously: close to intuition and technically simpler than the epsilon-delta approach or the traditional nonstandard approaches. This method is about to be tested in some Geneva high schools.

REFERENCES

- [1] Richard O’Donovan: Pre-University Analysis, in *The Strength of Nonstandard Analysis*, Springer (2007).
- [2] Karel Hrbacek: Stratified Analysis?, in *The Strength of Nonstandard Analysis*, Springer (2007).
- [3] Karel Hrbacek, Olivier Lessmann, and Richard O’Donovan: Analysis using Relative Infinitesimals (in preparation).

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