

Synthetic Higher Category Theory

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Analytic and Synthetic Theories

Analytic	Synthetic
What is it? <i>a line in the plane is a set of the form</i> $\{\lambda v + w \lambda \in \mathbb{R}, v \in \mathbb{R}^2 \setminus \begin{pmatrix} 0 \\ 0 \end{pmatrix}, w \in \mathbb{R}^2\}.$	How does it behave? <i>"Let it have been postulated to draw a straight-line from any point to any point."</i>
Group Theory	Set Theory (ZFC)
(Classical) Homotopy Theory	Homotopy Type Theory
Quasicategories, Complete Segal Spaces, ...	?

Synthetic ∞ -Category Theory

Category Theoretical Approaches

- Riehl, Verity; 2013: Homotopy 2-Category of $(\infty, 1)$ -Categories
- Cisinski, Cnossen, Nguyen, Walde: work in progress

Type Theoretical Approaches

- Riehl, Shulman; 2017: Simplicial Type Theory
- Gratzer, Weinberger, Buchholtz; 2024: Triangulated Type Theory
 - Kammermeier: work in progress
Idempotent Completion of $(\infty, 1)$ -categories in Triangulated Type Theory under the supervision of Reutter and Gratzer