

What is a Formal System? The Idea of Geometrical Characteristics from Leibniz to Voevodsky.

Leibniz's project of geometrical characteristic is closely related to that of universal characteristics but is more specific. It played a major role in the history of algebraic geometry and topology but in the 20th century received little attention in the logical and philosophical communities. This situation recently changed with the emergence of Homotopy Type theory (HoTT) in works of Vladimir Voevodsky and his collaborators. I briefly survey the history of the idea of geometrical characteristics in works of Leibniz, brothers Grassmanns and Peano, and demonstrate the continuity of these developments with HoTT. Finally I show how the concept of geometrical calculus and HoTT open a new perspective for formalization of mathematics and other sciences.