

Schülerinnen- und Schülervorstellungen vom Grenzwertbegriff beim Ableiten

Dissertationsschrift

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Abstract: Usually, in calculus teaching the concept of derivative is built on the (mental) basic ideas (“Grundvorstellungen”) of the slope of the tangents or, more generally and slightly differently, of the local rates of change. In my work with high school students I found two modes of viewing local (analytical, infinitesimal) objects, namely: (1) the “embedding view” (into the collection of neighbouring objects of the same type); and (2) the “isolating view” (i.e. ignoring that collection). These two modes emanate from the fundamental epistemological paradox that a set of objects with measure zero can form an object with a finite measure. Using the contradictory (even complementary) interrelationship of the views as a theoretical guideline, it can be seen that the usual “Grundvorstellungen” offered to the students in calculus teaching still completely bear the mental obstacles based on that paradox.