

Construct Analysis of Complex Variables:
Hypotheses and Historical Perspectives

Preliminary Research Report

ABSTRACT

Quantitative reasoning combined with gestures, visual representations, or mental images has been at the center of much research in the field of mathematics education. In this report we extend these studies to include complex numbers and complex variables. We provide a construct analysis for the teaching and learning of complex variables, which includes a description of existing frameworks that hypothesize about how students can best comprehend the arithmetic operations of complex numbers. In order to test these conjectures, we interviewed mathematicians, physicists, and electrical engineers to explore how they perceive complex variables content. Through phenomenological and microethnography analysis methods we found how these experts integrate perceptuo-motor activity and metaphors into their descriptions.

Keywords: Complex variables, Operational components, Perceptuo-motor activity, Structural components

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