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Mybert, Zingiswa; Jojo, Monica; Maharaj, Aneshkumar; Brijlall, Deonarain

From human activity to conceptual understanding of the chain rule.

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Summary: This article reports on a study which investigated first year university engineering students' construction of the definition of the concept of the chain rule in differential calculus at a University of Technology in South Africa. An APOS (action-process-objects-schema) approach was used to explore conceptual understanding displayed by students in learning the chain rule in calculus. Structured worksheets based on instruction designed to induce construction of conceptual understanding of the chain rule were used. A number of students used the straight form technique in differentiating complicated tasks while very few used either the link and Leibniz form techniques. In this manner differentiation of each function within the composite function was accomplished. Students either operated in the inter- or trans stages of the triad. It was found that even students who had inadequate understanding of composition of functions, performed well in the application of the chain rule.

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