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Visualizing three-dimensional calculus concepts: the study of a manipulative's effectiveness.

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Summary: With the help of the National Science Foundation, the Department of Mathematics at the University of Puerto Rico in Mayaguez has developed a set of manipulatives to help students of science and engineering visualize concepts relating to points, surfaces, curves, contours, and vectors in three dimensions. This article will present the manipulatives that have been developed, describe how they have been used in multivariable calculus classes, and provide the results of initial studies on their effectiveness.

Classification: I65 U65

Keywords: visualization; multivariable calculus; visual aids; curves; surfaces; vectors; parametric curves
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