Meeting: 1047, Urbana, Illinois, SS 7A, Special Session on Mathematical Visualization

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The construction of high quality geometric surfaces for mathematical analysis involves techniques from diverse areas, such as computational geometry and precise symbolic and numerical computations. Mathematica provides a computational system where it is possible to combine in a highly effective way the construction of complex geometric shapes driven by multiple symbolic and numerical algorithms such as: boundary representations, adaptive mesh generation, surface simplification, offset curves, mesh overlays, surface-surface intersections, constrained triangulations, algebraic implicit surfaces, arbitrary precision evaluation and automatic streamlines placements. For the visualization of arbitrary functions and data, these features provide a tool for the automatic modeling and visualization of mathematical properties such as piecewise continuous functions, discontinuities, branch cuts, vector fields properties. In this presentation, several examples of this integration will be presented which will show how, from the visualization perspective; Mathematica is an environment for the creation with a minimum amount of effort of high quality visualizations to be used by experts as well as casual users in areas such as education, art, scientific visualization and exploration. (Received January 27, 2009)