Mesh Generation for Interactive 3D Graphs in the NIST Digital Library of Mathematical Functions

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In 2010 the National Institute of Standards and Technology (NIST) launched the NIST Digital Library of Mathematical Functions (DLMF) and its companion hardcopy to replace the well-known NBS Handbook of Mathematical Functions (Abramowitz and Stegun, 1964). I will discuss the use of mesh generation to create high quality interactive 3D function surface visualizations for the DLMF, examine the challenges involved, show some of the latest visualizations about to be released, and discuss possible future enhancements.

Biography

Bonita V. Saunders, born in Portsmouth, Virginia, is a research mathematician in the Applied and Computational Mathematics Division, Information Technology Laboratory at the National Institute of Standards and Technology (NIST). In 1985 she was the first African American and first woman to obtain a Ph.D. in computational and applied mathematics from Old Dominion University, Norfolk, VA. Her research interests include numerical grid generation, numerical solution of partial differential equations, and visualization of special functions.

In 2001 she was selected by the National Association of Mathematicians (NAM) to present the Claytor Lecture at the Joint Mathematics Meetings in New Orleans in memory of W. W. Schieffelin Claytor, one of the first African Americans to publish mathematical research beyond the dissertation.

In 2011, she was awarded a Gold Medal, the highest honorary award granted by the U.S. Department of Commerce for her contributions as principal designer of graphs and visualizations for the NIST Digital Library of Mathematical Functions.

She has also used her work for another passion: inspiring the next generation of mathematical scientists. Over the years she has mentored middle and high school students, worked with student interns, and was recently awarded a Golden Eagle Award (2013) by the Alpha Nu Chapter of Delta Kappa Gamma Sorority in recognition of her leadership of a tutoring program for at-risk students sponsored by the Northern VA Alumnae Chapter of Delta Sigma Theta, Inc.