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A New Web-Enabled Compendium of Special Functions

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ABSTRACT

With co-funding by the U.S. National Science Foundation, the National Institute of Standards and Technology (formerly, the National Bureau of Standards) is developing a replacement for Abramowitz and Stegun's popular "Handbook of Mathematical Functions". The Bureau of Standards published this Handbook in 1964, and Dover reprinted it in 1965. Although errata were corrected through the 10th printing in 1972, the basic information is current only up to about 1960.

The Handbook has been a great success. It has never been out of print and continues to sell briskly. Total sales since 1964 are estimated to exceed 500,000, and the amazon.com sales rank falls consistently in the top 10,000 in its stock of over 4.5 million titles. As another measure of its success, a study of Science Citation Index showed that citations of the Handbook are increasing even more rapidly than the Index as a whole!

However, this trend cannot continue. Many advances in the theory, computation and application of special functions have taken place. With the help of a distinguished board of associate editors, the project leaders have selected tentative expert authors for 2/3 of the 36 or so anticipated chapters. Following Abramowitz and Stegun, the authors are using a highly condensed style of presentation that is targeted for applied mathematicians, scientists and engineers. All the work will be validated by independent experts to assure the best possible correctness and completeness.

The new compendium, called the "Digital Library of Mathematical Functions", will published on the Web and in a book with CD-ROM. Capabilities that are impossible to provide in books are being built into the Web edition, including: advanced search for formulas; downloading of formulas; links to software; and user-controllable visualization of functional surfaces (with rotation, zoom and animation). The project Web site is located at `http://www.nist.gov/DigitalMathLib`.

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