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NUMERICAL EVALUATION OF SPECIAL FUNCTIONS

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ABSTRACT. This document is an excerpt from the current hypertext version of an article that appeared in Walter Gautschi (ed.), *Mathematics of Computation 1943–1993: A Half-Century of Computational Mathematics*, Proceedings of Symposia in Applied Mathematics 48, American Mathematical Society, Providence, RI 02940, 1994. The symposium was held at the University of British Columbia August 9–13, 1993, in honor of the fiftieth anniversary of the journal *Mathematics of Computation*.

The original abstract follows.

Higher transcendental functions continue to play varied and important roles in investigations by engineers, mathematicians, scientists and statisticians. The purpose of this paper is to assist in locating useful approximations and software for the numerical generation of these functions, and to offer some suggestions for future developments in this field.

3. Packages, Libraries and Systems

This section reviews a selection of mathematical software with respect to its support for the numerical evaluation of special functions[6]. In some cases only a descriptive overview is given while in others cross references by individual function are given in the subsequent sections §4 and §5. The cross-referenced packages, libraries and systems are marked with a ♣. We used the following criteria in assigning the ♣ marks:

First, a marked item must be readily accessible. Often this means it is commercial software that is purchased or leased for a fee but we also include software that is distributed, sometimes over computer networks, by journals and research institutions.

Second, a marked item must have a significant following in North America. (In most cases the unmarked software is used widely elsewhere.)

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[1] /nesf/Sect0/Sect0.html
[2] /nesf/Sect2/Sect2.html
[3] /nesf/Sect3-1/Sect3-1.html
[4] ftp://gams.nist.gov/pub/lozier/nesf/Paper.ps.Z
[5] ftp://gams.nist.gov/pub/lozier/nesf/Sect3.ps.Z

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[6] General reviews of mathematical software appear regularly in the Computers and Mathematics column of the *Notices of the American Mathematical Society*. A useful guide to these reviews is given in [**Dev93**].

Third, a marked item must be reasonably comprehensive in its coverage of special functions.

3.1. Software Packages. [7]

3.2. Intermediate Libraries. [8]

3.3. Comprehensive Libraries. [9]

3.4. Interactive Systems. [10]

References

[Dev93] K. Devlin (ed.), *Computers and mathematics*, Notices Amer. Math. Soc. **40** (1993), 613–623.

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[7] /nesf/Sect3-1/Sect3-1.html

[8] /nesf/Sect3-2/Sect3-2.html

[9] /nesf/Sect3-3/Sect3-3.html

[10] /nesf/Sect3-4/Sect3-4.html