



PERGAMON

Journal of Quantitative Spectroscopy &
Radiative Transfer 78 (2003) 255

Journal of
Quantitative
Spectroscopy &
Radiative
Transfer

www.elsevier.com/locate/jqsrt

Note

A correction to a highly accurate Voigt function algorithm

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An algorithm for rapidly computing the complex Voigt function was published by Shippony and Read [1]. Its claimed accuracy was 1 part in 10^8 . It was brought to our attention by Wells [2] that it [1] was not meeting its claimed accuracy for extremely small but non-zero y values. Although true, the fix to the code is so trivial to warrant this note for those who use this algorithm. In the code, there exist in two subroutines, VoigtR1 and VoigtR3 a threshold variable called `tiny` = 1.0d-12. Any value of $10^{-12} > y > 0$ may have errors exceeding the target accuracy. The parameterization for `tiny` should have been the minimum precision of the computer (it is machine dependent, for the SGI Origin it is `tiny` = 2.2d-16). Fortunately, FORTRAN 90 has a function, `epsilon(y)` that returns the smallest allowable value, therefore setting `tiny` = `epsilon(y)` will ensure the algorithm's accuracy on any platform.

We thank R.J. Wells for bringing this error to our attention.

References

- [1] Shippony Z, Read WG. A highly accurate Voigt function algorithm. JQSRT 1993;50:635–46.
- [2] Wells RJ. Rapid approximation to the Voigt/Faddeeva function and its derivatives. JQSRT 1999;62(1):29–48.

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