The four double-hypergeometric Appell functions, a complete implementation in a computer algebra system

E.S. Cheb-Terrab¹

¹ Maplesoft R&D, Canada, ecterrab@maplesoft.ca

The four multi-parameter Appell functions, AppellF1, AppellF2, AppellF3, and AppellF4 are double hypergeometric functions that vastly extend the 2F1 hypergeometric and some cases of the MeijerG functions, and through them also include as particular cases most of the known functions of mathematical physics. These Appell functions have been popping up with increasing frequency in applications in quantum mechanics, molecular physics, and general relativity. In this talk, a full implementation of these functions in the Maple computer algebra system, including, for the first time, their numerical evaluation over the whole complex plane, is presented, with details about the symbolic and numerical strategies used.

References

- [1] P. Appell, J. Kampe de Feriet, *Fonctions Hypergeometriques et hyperspheriques*, Gauthier-Villars (1926).
- [2] H. M. Srivastava, P. W. Karlsson, *Multiple Gaussian Hypergeometric Series*, Ellis Horwood (1985).