On the arithmetic of d’Alembertian functions

Clemens G. Raab
Deutsches Elektronen-Synchrotron, Zeuthen (Germany)
clemens.raab@desy.de

Abstract

D’Alembertian functions can be characterized as nested indefinite integrals over hyperexponential functions. The representation of d’Alembertian functions in terms of such nested integrals is far from unique. We define a family of basis functions by restricting the hyperexponential functions occurring in the integrands. Based on this we obtain a canonical form for d’Alembertian functions. We also exhibit the algebraic relations among d’Alembertian functions. An algorithm for computing canonical forms of d’Alembertian functions and their indefinite integrals will be given, which builds on corresponding results for hyperexponential functions.

Keywords
D’Alembertian functions, Hyperexponential functions, Nested integrals, Canonical forms