

Spectral Theory and Applications

Solutions of the system of pde's for Appell hypergeometric F_2 , a tribute to Per O.M. Olsson

TOM H. KOORNWINDER

University of Amsterdam, Netherlands

T.H.Koornwinder@uva.nl

Appell introduced four different two-variable analogues of the Gauss hypergeometric series. Each of these is a solution of a system of two pde's. In particular, the system of pde's associated with Appell's hypergeometric $F_2(a; b_1, b_2; c_1, c_2; x, y)$ admits a rich set of explicit solutions, which was most comprehensively studied by Per O.M. Olsson (Dept. of Theoretical Physics, Royal Institute of Technology, Stockholm) in a paper [?] which should have deserved more attention. The lecture will survey these solutions. Next double integral representations for some of these solutions, some possibly new, will be produced and proved in a unified way, using the concept of transmutation. This extends work recently done by the speaker [?] in the one-variable case. The research presented here is inspired by work in progress by Enno Diekema, and will include some of his results.

References

- [1] T.H. Koornwinder, Fractional integral and generalized Stieltjes transforms for hypergeometric functions as transmutation operators, SIGMA 11 (2015), 074, 22 pp.; arXiv:1504.08144.
- [2] P.O.M. Olsson, On the integration of the differential equations of five-parametric double-hypergeometric functions of second order, J. Math. Phys. 18 (1977), 1285–1294.