

Discrete variations on an old special functions theme

12.02**Ciprian-Sorin Acatrinei***(NIPNE, Bucharest, Romania)***Time:** Monday 22.07., 11:00 - 11:30, Room HS 6

Abstract: A discretization scheme is discussed for field theories defined over $2 + 1$ and $3 + 1$ dimensional spaces, with particular emphasis on the special-functions-type solutions of their equations of motion. The space-time coordinates are assumed to be operators forming a non-commutative algebra; in the representation chosen, the radial coordinate becomes discrete, whereas the dependence on the other coordinates transfers to nonlocal field correlations. The discrete equations of motion and their complete solutions are presented in detail, together with their continuum/commutative limit. In $2 + 1$ dimensions one obtains a discrete extension of the Bessel and Neumann functions, passing through less known aspects of the Laguerre polynomials recurrence relation. In $3 + 1$ dimensions the relevant recurrence relation is the one satisfied by the Hahn polynomials.