

An algorithmic summation theory for indefinite nested sums and products**06.07****Carsten Schneider***(Research Institute for Symbolic Computation, Johannes Kepler University, Linz, Austria)***Time:** Wednesday 24.07., 11:30 - 12:00, Room HS 5

Abstract: Inspired by Karr's pioneering work (1981) we developed a summation theory of difference rings that enables one to rephrase special functions in terms of indefinite nested sums in the setting difference rings. Within this representation certain optimality criteria are fulfilled: e.g., the objects represented in the difference ring (except elements such as the alternating sign) do not satisfy any polynomial relations or the nesting depth of the arising sums have minimal nesting depth. Combining such optimal representations of special functions in combination with definite summation algorithms, like creative telescoping and recurrence solving in the setting of difference rings, yield a strong summation machinery for practical problem solving. We will demonstrate these features implemented in the summation package Sigma by concrete examples coming from combinatorics and particle physics.