



**universität
wien**

Fakultät für Mathematik

Einladung

zum

„Kombinatorischen Nachmittag“

anlässlich

des 80. Geburtstages

von

emer. o. Univ.-Prof. Dr. Johann Cigler

am

Mittwoch, 25. Oktober 2017

Programm

14:00 Uhr Begrüßung
Dekan Christian Krattenthaler
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**14:15 Uhr** Computer Algebra in the q-Calculus  
*Christoph Koutschan, RICAM, Linz*

Johann Cigler in his papers has contributed significantly to the so-called q-calculus, where the goal is, for example, to find and to investigate q-analoga of combinatorial quantities and identities. Of course, the rapid development of computer algebra doesn't stop at this area of mathematics. We discuss which tasks can already nowadays be tackled with the computer, in a more or less automatic way, and at the same time, we highlight the limits of current software packages.

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14:45 Uhr Factorization of C-finite Sequences
Manuel Kauers, Institut für Algebra, JKU Linz

A sequence is called C-finite if it satisfies a linear recurrence equation with constant coefficients, such as the Fibonacci recurrence. It is well-known and easy to show that the product of two C-finite sequences is again a C-finite sequence. This fact is algorithmic in the sense that we can compute a recurrence of the product from known recurrences for the factors. In the talk, we consider the inverse problem: given a C-finite recurrence, we want to decide whether it can be written (nontrivially) as the product of two C-finite sequences. This is joint work with Doron Zeilberger.

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**15:15 Uhr** Kaffee und Kuchen  
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15:45 Uhr Symbolic Summation for Combinatorics and Particle Physics
Carsten Schneider, RISC, JKU Linz

In the last two decades the difference ring approach for symbolic summation has been pushed forward substantially. Besides the computation of recurrence relations of definite sums, one can solve recurrence relations in terms of indefinite nested sums defined over $(q-)$ hypergeometric products. Combined with simplification algorithms for indefinite nested sums this might lead to interesting closed forms of definite sums. We will illustrate these summation techniques by challenging examples that arose in the fields of combinatorics and particle physics.

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**16:15 Uhr** Triangular Alternating Sign Arrays  
*Ilse Fischer, Universität Wien*

Alternating sign matrices are classical combinatorial objects that have been introduced in the 1980s by Mills, Robbins and Rumsey. In this talk I introduce three types of triangular alternating sign arrays. Surprisingly, the numbers of these alternating sign arrays can be expressed by formulas that have appeared before as the counting formulas for alternating sign matrices, cyclically symmetric plane partitions, and vertically and horizontally symmetric alternating sign matrices, respectively. As the proofs of these results are highly computational in nature, our results give rise to the open problems of finding explicit bijections. Such problems belong to the most challenging open problems in this field.

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