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Seminar "Macdonald-Polynome" - SS 2025

Talks:

0. *Overview and preliminaries on symmetric functions.*
   Chapters 1 and 2 of [N].

1. *Schur polynomials, Part I.*
   Sections 3.1 - 3.3. of [N]. (Definitions and basic properties).

2. *Schur polynomials, Part II.*
   Sections 3.4 - 3.8. of [N]. In particular: equivalence of two different definitions of the Schur polynomials. Optionally: Section 3.9 (link to the representation theory of GL_n)

3. *Macdonald polynomials: definitions and examples.*
   Chapter 4 of [N]. Based on the diagonalization of the Macdonald-Ruijsenaars operator. Sections 4.4 and 4.5 may be omitted, or make up a short talk.

4. *Orthogonality and higher order q-difference operators.*
   Start with the necessary background on q-shifted factorials from Section 4.4. Omit Section 5.4.2 (direct proof of commutativity). Section 5.5. may be sketchy. Omit Section 5.6 (= remarks related to the q-difference operators).

5. *Self-duality, Pieri formula and Cauchy formulas.*
   Chapter 6 of [N]. May be shortended by omitting some proofs or split into 2 talks: 6.1 - 6.4. and 6.5 - 6.6.

6. *Littlewood-Richardson coefficients and branching coefficients.* Sections 7.1 - 7.4 of [N].

Literature:

[N] M. Noumi, Macdonald Polynomials, Springer-Verlag 2023.

Additional background:

I. G. Macdonald, Symmetric Functions and Hall Polynomials. Oxford Science Publications, 2008.