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Inequalities Defining Polyhedral Realizations of Affine Types and Extended Young Diagrams

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The crystal bases are powerful tools for studying the representation theory of Lie algebras or quantum groups. By realizing crystal bases as combinatorial objects, one can reveal skeleton structures of representations. Nakashima and Zelevinsky invented "polyhedral realizations", which are realizations of crystal bases as integer points in some polyhedral convex cones or polytopes. It is a natural problem to find explicit forms of inequalities that define the polyhedral convex cones and polytopes.
In this talk, we will briefly explain an outline of a theory of Lie algebras and quantum groups and give explicit forms of inequalities in terms of combinatorial objects called extended Young diagrams when the associated Lie algebra is of a classical affine type.

Orateur: Prof. KANABUKO, Yuki (MPIM, Bonn)