

A TABLEAUX REALIZATION OF VERMA MODULES

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JOINT WORK WITH V. FUTORNY, D. GRANTCHAROV AND L.E. RAMÍREZ

Abstract: In a classical work in the fifties, I. Gelfand and M. Tsetlin gave a combinatorial presentation of finite dimensional irreducible representations of the Lie algebra $\mathfrak{gl}(n; \mathbb{C})$. For each representation they produced a basis parametrized by certain arrays of integral numbers, now known as Gelfand-Tsetlin tableaux, along with explicit formulas for the action of the generators of the Lie algebra. The question we are interested in is: what other modules over $\mathfrak{gl}(n; \mathbb{C})$ admit tableaux type bases and explicit matrix coefficients? In particular, is there such a presentation for Verma modules? In a recent work with V. Futorny, D. Grantcharov and L.E. Ramírez, we show that we can at least embed any Verma module inside a (very big) module with an explicit presentation. I will give an idea on how this result is obtained, and how to use it as a combinatorial tool in the study of Verma modules.