Algebra Seminar

The Pauli graded modules $M_\lambda^C \otimes V(2n)$

Speaker

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Abstract:

In my previous talks, I discussed the gradings of the weight $\mathfrak{sl}_2(\mathbb{C})$-modules. Then I explained the gradings of the torsion-free $\mathfrak{sl}_2(\mathbb{C})$-modules of rank 1. Then I focused on some new results about the torsion-free $\mathfrak{sl}_2(\mathbb{C})$-module of rank 2. I talked about the construction of a new family of torsion-free $\mathbb{Z}_2^2$-graded modules of rank 2 and their simplicity. The elements of this family denoted by M_λ^C, $\lambda \in \mathbb{C}$. In this talk, I will mention some new results about the module $L_{(\lambda,2n)} = M_\lambda^C \otimes V(2n)$, where $V(2n)$ is the simple finite dimensional $\mathfrak{sl}_2(\mathbb{C})$-module of highest weight $2n$. Hence both $V(2n)$ and M_λ^C are Pauli graded, it follows that $L_{(\lambda,2n)}$ is also Pauli graded. First, I will give a full description of the module $L_{(\lambda,2)} = M_\lambda^C \otimes V(2)$, $\lambda \in \mathbb{C}$. I will show that this module has exactly three Casimir constant, which are distinct if $\lambda \notin \{-2, -1, 0\}$. Using some Kostant's theorems, I will explain that this module is isomorphic to a direct sum of modules of the form M_α^C for some $\alpha \in \mathbb{C}$. Finally, I will extend the last result to the module $M_\lambda^C \otimes V(2n)$.