

ON RANK VARIETIES FOR VERMA MODULES OF HIGHER FROBENIUS KERNELS

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ABSTRACT

This is a report on a joint project with Rolf Farnsteiner.

In this talk we shall discuss new results on rank varieties of Verma modules of Frobenius kernels of reductive algebraic groups. We indicate how these geometric results can be used to determine the structure of the component of the stable Auslander-Reiten quiver containing the isoclass of a Verma module.

More specifically, let G_r be the r -th Frobenius kernel of a connected, reductive group G and let $Z_r(\lambda)$ be the Verma module of G_r with highest weight λ . By $\Theta_r(\lambda)$ we denote the component of the stable Auslander-Reiten quiver containing the isoclass of $Z_r(\lambda)$. It was shown in [1] that $\Theta_1(\lambda)$ is of tree class A_∞ and that $Z_1(\lambda)$ is located at an end of $\Theta_1(\lambda)$. The goal of this project is to extend this result to higher Frobenius kernels. We shall explain how new results on the rank varieties of $Z_r(\lambda)$ for $r \geq 2$ allow us to reduce this study of the Auslander-Reiten components $\Theta_r(\lambda)$ to the second Frobenius kernel of $\mathrm{SL}(2)$.

REFERENCES

- [1] R. Farnsteiner, G. Röhrle. *Almost split sequences for Verma modules*. Math. Ann. **322** (2002), 701–743.

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