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Hessenberg varieties and Poisson slices

Hessenberg varieties constitute a natural generalization of Grothendieck−Springer fibres, and their study lies at the interface of algebraic geometry, representation theory, and symplectic geometry. One defines Hessenberg varieties in the presence of Lie-theoretic data, which often include a complex semisimple Lie algebra $\mathfrak{g}$ with adjoint group G, the wonderful compactification $\overline{G}$ of G, and the log cotangent bundle $\mu : T^*\overline{G}(\log D) \longrightarrow \mathfrak{g} \oplus \mathfrak{g}$. The family of *standard Hessenberg varieties* is then a log symplectic Hamiltonian G-variety $\nu : \mathrm{Hess} \longrightarrow \mathfrak{g}$ bearing a close connection to the Kostant−Toda lattice. Balibanu has constructed a Poisson isomorphism

$$\mu^{-1}(\mathcal{S} \times \mathcal{S}) \cong \nu^{-1}(\mathcal{S}) \quad (*),$$

where $\mathcal{S} \subseteq \mathfrak{g}$ is a principal Slodowy slice. This allows one to embed generic fibres of ν into $\overline{G}$.

I will explain that $(*)$ extends to a G-equivariant Poisson bimeromorphism

$$\mu^{-1}(\mathfrak{g} \times \mathcal{S}) \cong \mathrm{Hess} \quad (**),$$

and that $(**)$ is an isomorphism if $\mathfrak{g} = \mathfrak{sl}_2$. This represents joint work with Markus Röser.