

The U -invariant ring of the nilpotent cone

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Abstract: We consider the conjugation-action of the standard unipotent subgroup U of $\mathrm{GL}_n(\mathbf{C})$ on the nilpotent cone \mathcal{N} of complex nilpotent matrices of square-size n . Concerning this very basic action, the calculation of the invariant ring $\mathbf{C}[\mathcal{N}]^U$ is an obvious task and its explicit structure is not known yet. In this talk, we discuss a generic normal form of the U -orbits in \mathcal{N} , define a set of spanning U -invariants of $\mathbf{C}[\mathcal{N}]^U$ and use these concepts to generically separate the orbits. We find out that there is a toric variety closely related to the algebraic U -quotient of \mathcal{N} which we discuss in detail.