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On the Dimension of the Sheets of a Reductive Lie Algebra

Let \mathfrak{g} be a complex finite dimensional Lie algebra and G its adjoint group. Following a suggestion of A. A. Kirillov, we investigate the dimension of the subset of linear forms $f \in \mathfrak{g}^*$ whose coadjoint orbit has dimension $2m$, for $m \in \mathbb{N}$. In this paper we focus on the reductive case. In this case the problem reduces to the computation of the dimension of the sheets of \mathfrak{g} . These sheets are known to be parameterized by the pairs $(\mathfrak{l}, \mathcal{O}_{\mathfrak{l}})$, up to G -conjugacy class, consisting of a Levi subalgebra \mathfrak{l} of \mathfrak{g} and a rigid nilpotent orbit $\mathcal{O}_{\mathfrak{l}}$ in \mathfrak{l} . By using this parametrization, we provide the dimension of the above subsets for any m .

Keywords: Reductive Lie algebra, coadjoint orbit, sheet, index, Jordan class, induced nilpotent orbit, rigid nilpotent orbit.

MSC: 14A10, 14L17, 22E20, 22E46