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Varieties of Elementary Subalgebras of Submaximal Rank in Type A

Let $G$ be a connected simple algebraic group over an algebraically closed field $k$ of characteristic $p > 0$, and $\mathfrak{g} = \text{lie}(G)$. We additionally assume that $G$ is standard and is of type $A_n$. Motivated by the investigation of the geometric properties of the varieties $E(r, \mathfrak{g})$ of $r$-dimensional elementary subalgebras of a restricted Lie algebra $\mathfrak{g}$, we will show in this article the irreducible components of $E(\text{rk}_p(\mathfrak{g}) - 1, \mathfrak{g})$ when $\text{rk}_p(\mathfrak{g})$ is the maximal dimension of an elementary subalgebra of $\mathfrak{g}$.

Keywords: Elementary subalgebras, irreducible components.

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