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The Lie Module and its Complexity.

The complexity of a module is an important homological invariant that measures the polynomial rate of growth of its minimal projective resolution. For the symmetric group Σ_n , the Lie module $\text{Lie}(n)$ has attracted a great deal of interest in recent years. In this talk, I will show that the complexity of $\text{Lie}(n)$ in characteristic p is t where p^t is the largest power of p dividing n , thus proving a conjecture of Erdmann, Lim and Tan. The proof uses work of Arone and Kankaanrinta which describes the homology $H^\bullet(\Sigma_n, \text{Lie}(n))$ and earlier work of Hemmer and Nakano on complexity for modules over Σ_n that involves restriction to Young subgroups. (Received September 14, 2015)