

Cartan matrices for restricted Lie algebras

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A classical result by Richard Brauer says: The Cartan matrix C of a finite group over a splitting field of prime characteristics is the product of its decomposition matrix D with the transpose of the decomposition matrix: $C = {}^tD \cdot D$. This fact is a special case of the following general result: Consider an algebra free of finite rank over a complete discrete valuation ring. Then its Cartan matrix C_k over the residue field k is related to the Cartan matrix C_K over the fraction field K via $C_k = {}^tD \cdot C_K \cdot D$ provided k and K are splitting fields. Here D again is a decomposition matrix. In my talk I'll show how this observation can be applied to the representation theory of restricted Lie algebras.