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Vanishing of trace forms in low characteristics

A finite-dimensional representation of an algebraic group G gives a trace symmetric bilinear form on the Lie algebra of G. We give a criterion in terms of root systems for this form to vanish. As a corollary, we show that a Lie algebra of type E_8 over a field of characteristic 5 does not have a so-called "quotient trace form".

This is joint work with J-P. Serre.