Spectral curves and roots of Kac–Moody algebras

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Abstract

We study the following question: given a finite number of conjugacy classes in $\mathfrak{gl}_r(\mathbb{C})$ with generic eigenvalues when does there exist a matrix from each class whose sum is equal to 0. The problem can be translated into a purely combinatorial one. We give a geometric / invariant theoretic proof of a theorem of Crawley–Boevey that a solution exists if and only if the associated combinatorial data is a root of the corresponding Kac–Moody algebra. This is joint work with Olivier Biquard.