SÉMINAIRE NICOLAS BOURBAKI
20–21 juin 1998
RÉSUMÉS DES EXPOSÉS

FULTON William *Eigenvalues of sums of Hermitian matrices* [*after A. Klyachko*]

The problem solved by Klyachko is to characterize the possible eigenvalues of a sum of a given number of Hermitian matrices in terms of the eigenvalues of the summands. The solution is related to Schubert calculus, and the proof uses geometric invariant theory. There will also be a brief discussion of work of Agnihotri and Woodward, and Belkale, on a similar problem for products of unitary matrices; here the solution is related to quantum Schubert calculus.

GROSS Leonard *Harmonic functions on loop groups*

For any compact Lie group K, the loop group $\mathcal{L} \equiv \mathcal{C}(\mathcal{S}^\infty; \mathcal{K})$ possesses both a natural gradient operator and a natural probability measure, μ. The associated "Laplacian" in $L^2(\mathcal{L}, \mu)$ has been the subject of investigations which are aimed at developing a Hodge–deRham theorem over $\mathcal{L}$. The harmonic functions over $\mathcal{L}$ have recently been described. The techniques of proof have led to a collection of unitary isomorphisms between functions over K, holomorphic functions over the complexification of K and a Hilbert completion of the universal enveloping algebra.

LITTELMANN Peter *Bases canoniques et applications*

Nous présenterons deux récents développements de la théorie des bases canoniques. D'une part, Lusztig a généralisé la notion classique de totale positivité d'une matrice, il les caractérise par la positivité de leurs coefficients par rapport à la base canonique, et Berenstein, Fomin et Zelevinsky les déterminent par un ensemble minimal d'inégalités. D'autre part, l'étude des matrices de passage de la base canonique à d'autres bases "naturelles" a permis d'obtenir certains polynômes de Kazhdan-Lusztig (Frenkel, Khovanov, Kirillov), ainsi que des matrices de décomposition pour les représentations des algèbres de Hecke aux racines de l'unité (Ariki, Grojnowski, Lascoux, Leclerc, Thibon).

PANDHARIPANDE Rahul *Rational curves on hypersurfaces* [*after A. Givental*]

Givental's formalism relating hypergeometric series to solutions of quantum differential equations arising from hypersurfaces in projective space will be explained. A particular case of this relationship is Givental's proof of the Mirror prediction for the numbers of rational curves on the Calabi-Yau quintic 3-fold. The point of view of the talk will be entirely algebro-geometric.

VAN DER PUT Marius *Recent work on differential Galois theory* [*following J.-P. Ramis, C. Mitschi and M.F. Singer*]

Let K be a differential field with an algebraically closed field of constants C of characteristic 0. To a linear differential equation of order n over K one associates a differential Galois group which is an algebraic subgroup of $\mathrm{GL}(n, C)$. The inverse problem reads: "which linear algebraic groups occur as differential Galois group ?" The inverse problem is solved by J.-P. Ramis for local and global analytic situations. A constructive solution of the inverse problem for the differential field $C(x)$ (for connected groups) has been given by C. Mitschi and M.F. Singer.