

First Joint Meeting Brazil Italy of Mathematics
Special Session, Geometric Structures, Lie Theory and
Applications

Rio de Janeiro, August 29 - September 02, 2016

Title: Integrals in the Grassmannians of lines.

Author: Letterio Gatto

Abstract: Let $G(r, n)$ be the Grassmann variety parametrizing r -dimensional subspaces of \mathbb{C}^n . By an integral on a Grassmannian we mean the degree of a product of special Schubert cycles. The most popular is $\int_{G(r, n)} \sigma_1^{r(n-r)} \cap [G(r, n)]$ which coincides with the Plücker degree of the Grassmannian $G(r, n)$. The talk will be concerned with the particular case of degree of Schubert varieties in Grassmannian of lines. If time permits, the following two aspects will be discussed: the former is the observation due to Santiago that the generating function of the degrees of the Grassmannians $G(2, n)$ of lines in \mathbb{P}^{n-1} can be expressed by means of modified Bessel functions of the first kind; the latter is the kinship of more general integrals in $G(2, n)$ with a theorem by Scherbak and Varchenko in the context of critical points, $sl_2(\mathbb{C})$ -representation and Fuchsian equations with polynomial solutions. The connection with both topics is the notion of Hasse-Schmidt derivation on a Grassmann Algebra, a quite effective device to make computations in Schubert calculus and a purely algebraic combinatorial proof of a formula by Scherbak.