Mini-Course
Geometric Invariant Theory and Character Varieties

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Meeting Times (Room **6.2.33**)
Friday, 30/6   11:00 -12:30
Monday, 3/7   11:00 -12:30
Wednesday, 5/7   11:30 -12:30

Description:

1. Introduction to Geometric Invariant Theory and Character Varieties

We will introduce some aspects of Geometric Invariant Theory (GIT) and character varieties of finitely presented groups, and discuss their relation with Higgs bundles in the case of surface groups.

2. Stratification of G-character Varieties and Mixed Hodge Structures

We will describe natural methods for stratifying general G-character varieties in the context of affine GIT and we will introduce the stratification by partition type of the $GL(n, \mathbb{C})$-character varieties. We will also present the main properties of the Serre (or so called E-) polynomials defined from mixed Hodge structures on complex quasi-projective varieties.

3. Generating functions of E-polynomials

We will present a concrete relation, in terms of plethystic functions, between the generating series for E-polynomials of $GL(n, \mathbb{C})$-character varieties of finitely presented groups and the one for the irreducible loci.

References

[1] C. Florentino, A. Nozad and A. Zamora, *Generating series for the E-polynomials of GL(n,$\mathbb{C}$)-character varieties*, Math. Nachr. (2022), 1–24.

[2] C. Florentino, A. Nozad and A. Zamora, *Serre polynomials of SL_n- and PGL_n- character varieties of the free groups*, Journal of Geometry and Physics 161, 104008 (2021).

[3] S. Mozgovoy and M. Reinke, *Arithmetic of character varieties of free groups*, Int. J. Math. 26 (2015) 1550100.

[4] S. Mukai, An introduction to invariants and moduli, vol. 81, Cambridge U. P., 2003.