CENTRO DE MATEMÁTICA UNIVERSIDADE DO PORTO

GEOMETRY AND TOPOLOGY SEMINAR

Quadratic complexes, singular varieties and moduli

Dan Avritzer

Universidade Federal de Minas Gerais

Abstract. Let G be the Grassmannian of lines in $\mathbb{P}^3$ embedded in $\mathbb{P}^5$ as the Plücker quadric Q. The intersection of Q with a second hypersurface of degree d is what is called a complex of lines of degree d. When we consider the intersection of Q with a second quadratic hypersurface in $\mathbb{P}^5$, P, we have a quadratic complex. Let $X = Q \cap P$ be a quadratic complex that, in this talk, we assume to be non-singular, meaning X is non-singular.

The quadric Q contains a 3-dimensional family of planes parametrizing lines in $\mathbb{P}^3$, going through a point. These are known in the literature as α-planes. An α-plane, $\alpha(p)$, intersects the quadric P in a conic $K_{\alpha(p)}$. The singular surface S associated to the quadratic complex X is defined to be the $p \in \mathbb{P}^3$ such that the plane $\alpha(p)$ corresponding to p intersects the quadric P in a singular conic $K_{\alpha(p)}$.

$$S = \{p \in \mathbb{P}^3 \text{ such that } rank(K_{\alpha(p)}) \leq 2\}$$

All this is very classical and can be read for instance in the book by Griffiths & Harris, Principles of Algebraic Geometry. In a joint paper with H. Lange, (D. Avritzer e H. Lange, *Moduli spaces of quadratic complexes and their singular surfaces*, Geom. Dedicata V. **127** (2007) p. 177-179.), we studied the moduli spaces associated to this objects not only when X is non-singular but also in the singular case. It turns out that there is an equivariant map defined that associates to a quadratic line complex X its singular surface S. The inverse image of a given singular surface S is what is called the Klein variety.

In this seminar, I will explain these ideas and their relationship with the moduli space of vector bundles a result that goes back to a famous paper of Narasimhan & Ramanan and was proved independently by P. Newstead.

FRIDAY, OCTOBER 27	15:30	ROOM 1.09

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

UID/MAT/00144/2013