CENTRO DE MATEMÁTICA UNIVERSIDADE DO PORTO

GEOMETRY AND TOPOLOGY SEMINAR

Contact sub-Riemannian structures as non-transitive Cartan geometries

João Nuno Mestre
Universidade de Coimbra / CMUC

Abstract. Cartan geometries are structures on manifolds which are infinitesimally modelled on homogeneous spaces. For example, Riemannian structures are infinitesimally modelled by the euclidean space. The classical theory deals with "transitive" Cartan geometries, where the infinitesimal model is the same at every point. Contact sub-Riemannian manifolds have a hyperplane distribution equipped with a metric (not necessarily defined on the whole tangent bundle). The methods of Cartan geometry were applied to them successfully in order to obtain invariants, but only in the transitive case so far. However, starting in dimension 5, these structures are usually "non-transitive", as their infinitesimal models change at different points.

In this talk we will discuss how to associate a suitable non-transitive version of a Cartan connection to a large class of contact sub-Riemannian manifolds with varying infinitesimal models. We do this by considering the (non-transitive) groupoid of sub-Riemannian symmetries, and building a "non-transitive" analogue of a Cartan connection on it.

The talk is based on joint work with Ivan Beschastnyi and Francesco Cattafi.

FRIDAY, MAY 22 **15H15** **ROOM FC1.007**

With the support of UID/00144/2025 – Centro de Matemática da Universidade do Porto

There will be coffee after the talk.