
HARDY INEQUALITIES IN THE HEISENBERG GROUP

Valentina FRANCESCHI

FMJH & LMO, Université Paris Sud, valentina.franceschi@math.u-psud.fr

We present recent results about Hardy inequalities in the n -th Heisenberg group. We show that, contrary to the Euclidean case, a radial Hardy inequality, i.e., a Hardy inequality taking into account only the directional derivative w.r.t. the sub-Riemannian distance, does not hold in this context for any dimension. Motivated by this fact, we then suggest the study of a non-radial Hardy inequality, based on the construction of specific polar-type coordinates following from the explicit synthesis of sub-Riemannian geodesics. We prove a sharp weighted non-radial inequality that imply (non-sharp) bounds for the non-radial Hardy constant on homogeneous cones. We underly through the latter a strong difference with respect to the Euclidean case.

Based on joint work with Dario Prandi.

Keywords: Hardy inequality, Heisenberg group, sub-Riemannian distance.