

# Hypoellipticity, pseudodifferential operators, tangent groupoids, and the Helffer-Nourrigat conjecture

*mardi 29 août 2023 09:00 (45 minutes)*

In 1979, Helffer and Nourrigat made a very broad conjecture about the hypoellipticity of differential operators which are polynomials in a family of vector fields. Their conjecture generalises a vast number of results —eg, the elliptic regularity theorem, Hörmander's sums-of-squares theorem, and Rockland's Theorem (proven by Helffer-Nourrigat) on hypoellipticity for left invariant vector fields on graded nilpotent Lie groups. Helffer and Nourrigat proved several cases of the conjecture, but it has become newly accessible thanks to a beautiful observation by Debord and Skandalis which characterizes classical pseudodifferential operators in terms of Connes'tangent groupoid. We will discuss how groupoidal methods can be used to resolve the Helffer-Nourrigat conjecture. This talk is based on joint work with E. Van Erp, with I. Androulidakis and O. Mohsen, and with N. Couchet.

**Orateur:** YUNCKEN, Robert (Université de Lorraine)