On the De Giorgi - Nash - Moser theorem for hypoelliptic operators
joint work with H. Dietert

I would like to present a relative simple approach to show uniform boundedness and a weak Harnack inequality for general hypoelliptic operators i.e.

$$\left(X_0 - \sum_{i,j=1}^{m} X_i^t a^{ij} X_j\right) u = - \sum_{i=1}^{m} X_i^t f^i + g \,. \tag{0.7}$$

where $\lambda \leq a^{ij} \leq \Lambda$ is uniformly elliptic but merely measurable and the X_i are given smooth vectorfields. Furthermore we assume that they satisfy the Hörmander condition i.e. their Lie-Algebra spans $\mathbb{R}^{n+1}$.

The novelty is the avoidance of a "general" Sobolev embedding and a "quantitative" Poincare inequality. Somehow our approach shows that one can somehow consider even the classical De Giorgi-Nash-Moser theorem as a "perturbation" of the poisson equation.

If time permits I would like to discuss as well how the geometry of the hypoelliptic equations come into play to obtain as a consequence the famous Hölder regularity.