GEOMETRIC ANALYSIS ON A FAMILY OF PSEUDOCONVEX HYPERSURFACES

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Consider the vector fields

$$X_1 = \partial_{x_1} + 2x_2|x|^{2(k-1)}\partial_t \ , \qquad X_2 = \partial_{x_2} - 2x_1|x|^{2(k-1)}\partial_t.$$

The vector fields $X = \{X_1, X_2\}$ can be considered as a basis of the subbundle $T^{(1,0)}(\partial\Omega_k)$ of the complex tangent bundle on the hypersurface

$$\partial\Omega_k = \{(z_1, z_2) \in \mathbf{C}^2 : \ \mathrm{Im}(z_2) = |z_1|^{2k}\}, \ \ k = 1, 2, \dots.$$

In this talk, we shall discuss the subRiemannian geometry induced by the sub-Laplacian

$$\Delta_X = \frac{1}{2}(X_1^2 + X_2^2).$$

We characterize the number of subRiemannian geodesics between the origin and any other point. We also compute a complex action function and discuss its relation with the fundamental solution and the heat kernel of the operator Δ_X.

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