1067-35-601 **Christopher J Winfield*** (winfield@madscitech.org). *Local Solvability on* $\mathbb{H}_1$: *Non-homogeneous operators.* Preliminary report.

Local solvability and non-solvability are classified for certain operators which are left-invariant on the Heisenberg group $\mathbb{H}_1$ of order $n \geq 2$. For a large subclass of our operators, (non-) solvability is determined by the highest order terms in X and Y. We study operators which can be written in form of polynomials with constant coefficients

$$P(X, Y) = P_n(X, Y) + Q(X, Y).$$

Here P_n is a homogeneous polynomial of degree $n \geq 2$ in a certain broad (so-called "generic") class; Q is any such polynomial but of order less than n; and, X, Y are the vector fields $X = \partial_x$, $Y = \partial_y + x\partial_z$.

Our operators can be viewed as perturbations of operators whose ($\mathcal{C}^\infty$) solvability is already classified in the present representation: $P_n(X, Y)$ is locally solvable if and only if the adjoint operators of both $\ker P(\pm i\partial_t, t)$ contain only the zero function. The solvability in our more general class is examined via asymptotic estimates of solutions certain ode's with a large parameter, analytic extensions of such solutions and a classification of related scattering matrices. (Received September 10, 2010)