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Christopher J Winfield* (winfielc@uwosh.edu), Mathematics Department, University of Wisconsin - Oshkosh, Oshkosh, WI. *Local Solvability of Some Partial Differential Equations with Polynomial Coefficients: Criteria Arising from ODE Asymptotic Estimates.*

Operators of the form $L = P(X, Y)$ for certain homogeneous polynomials P in the vector fields $X = \partial_x$, $Y = \partial_y + x^k \partial_z$ are studied for integers $k \geq 2$. We investigate conditions equivalent to local solvability in terms of certain Fourier representations in the form of certain ordinary differential equations. We develop criteria based on the asymptotic behavior of certain bases of solutions of the related ordinary differential equations, involving a parameter: Indeed, the criteria are stated in terms asymptotic estimates of scattering matrices depending on this parameter. In cases where the local solvability of the partial differential operator is known, asymptotic estimates of for related o.d.e. arise. For instance, with $L = X^2 + Y^2 + i\alpha[X, Y]$ (for real, fixed α) where local (non-) solvability is known (F. M. Christ, G. E. Karadzhov), we are able to make crude estimates for the scattering matrix (connection coefficients) for solutions to the associated o.d.e. (Received September 19, 2007)