1026-35-118 **Wenyuan Wu*** (wwu25@uwo.ca), Department of Applied Mathematics, University of Western Ontario, London, Ontario N6A5B7, Canada, and **Greg Reid**. *Symbolic-numeric Computation of Implicit Riquier Bases for PDE.*

Riquier Bases for systems of analytic PDE are, loosely speaking, a differential analogue of Grobner Bases for polynomial equations. They are determined in the exact case by applying a sequence of prolongations and eliminations to an input system of PDE.

We present a symbolic-numeric method to determine Riquier Bases in implicit form for systems which are dominated by pure derivatives in one of the independent variables and have the same number of PDE and unknowns.

The method is successful provided the prolongations with respect to the dominant independent variable have a block structure which is uncovered by Linear Programming and certain Jacobians are non-singular when evaluated at points on the zero sets defined by the functions of the PDE. For polynomially nonlinear PDE, homotopy continuation methods from Numerical Algebraic Geometry can be used to compute approximations of the points.

We give a differential algebraic interpretation of Pryce's method for ODE, which generalizes to the PDE case. A major aspect of the method's efficiency is that only prolongations with respect to a single (dominant) independent variable are made, possibly after a random change of coordinates. (Received February 22, 2007)