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Wenyuan Wu* (wenyuanwu@math.msu.edu), Department of Mathematics, Michigan State University, East Lansing, MI 48824. *F,G,H,I Bases for Polynomial Rings and their Relations.*

Gröbner basis and H-basis are well known in polynomial algebra. Formally integrable basis and Involutive basis are derived from the formal theory of partial differential equation. The relations among these bases will be discussed in this talk.

We show that Numerical Linear Algebra methods (specifically the Singular Value Decomposition), coupled with the geometric theory of differential equations, yields a new numerical approach in computational algebraic geometry. Unlike existing symbolic methods for exact systems, it could be applied to compute such bases even for approximate systems arising in applications. Other relative applications will also be discussed in this talk. (Received September 02, 2008)