1014-05-1106 **Moa Apagodu*** (mohamudm@math.rutgers.edu), Department of Mathematics, Rutgers University, Piscataway, NJ 08854, and **Doron Zeilberger** (zeilberg@math.rutgers.edu).

Enumerative and Probabilistic Applications of the Extended Wilf-Zeilberger Theory.

Many hitherto intractable problems, for example the exact (not just asymptotic!) value of the probability of returning to the origin after n steps in 3D-random walk with arbitrary steps and arbitrary probabilities, are now routinely doable thanks to the (multi-variable) WZ theory, in the sense of giving a linear recurrence equation with polynomial coefficients for the sequence of interest. Not only that, using the classical theory of the asymptotics of such sequences, pioneered by Poincare and completed by Birkhoff and Trijinski, that we implemented in Maple, one can now also, completely automatically, find the asymptotics, to any desired number of terms. This gives an alternative and much more elementary approach than using the Central Limit Theorem, and unlike the latter, can be extended to walks with ballot-type and other restrictions. (Received September 27, 2005)