Dan Shanks' CUFFQI Algorithm Resurrected

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In 1925, William E. H. Berwick outlined an approach for enumerating all cubic fields of a given discriminant via 3-virtual units in the associated quadratic resolvent field. Unfortunately, the Berwick construction can produce generating polynomials with very large coefficients. In 1987, Daniel Shanks - a long-time Editor of Mathematics of Computation - devised an ingenious algorithm for finding 3-virtual units that produce cubic polynomials with very small coefficients. He assigned his method the Fortran designator CUFFQI (pronounced "cuff-key") which is short for "CUbic Fields From Quadratic Infrastructure". Although implemented in 1990 by Gilbert Fung as part of his PhD thesis, the CUFFQI algorithm was never published. In this talk, we present a modern version of this algorithm and, time-permitting, an extension to function fields.