1023-68-446 **Navin Kashyap*** (nkashyap@mast.queensu.ca), Dept. Mathematics and Statistics, Jeffery Hall, Room 410, Queen's University, Kingston, ON K7L 3N6, Canada. *A code decomposition theory.*

Matroid theory draws upon two sources – matrices and graphs. One of the strengths of this theory is that it allows for techniques used in one of these sources to be applied in the other. An example of this is the powerful matroid decomposition theory initiated by Paul Seymour in the early 1980's, which has its roots in graph theory. This theory, when applied to matrices over the binary field, i.e., binary linear codes, yields a powerful decomposition theory for such codes. We will give an overview of this code decomposition theory, and discuss some of its implications in the context of the recently-discovered formulation of maximum-likelihood (ML) decoding of a binary linear code as a linear programming problem. We will translate matroid-theoretic results of Grötschel and Truemper from the combinatorial optimization literature to give examples of non-trivial families of codes for which the ML decoding problem can be solved in time polynomial in the length of the code. However, there is good reason to believe that such code families are not asymptotically good, in that their rate and relative minimum distance cannot both be positive, asymptotically in codelength. (Received September 13, 2006)