1057-05-150   **Rudi Pendavingh** (`rudi@win.tue.nl`), Technische Universiteit Eindhoven, Postbus 513, 5600MB Eindhoven, Netherlands, and **Stefan van Zwam*** (`Stefan.van.Zwam@cwi.nl`), Combinatorics and Optimization, University of Waterloo, 200 University Avenue West, Waterloo, Ontario N2L 3G1, Canada. *Representing some non-representable matroids.* Preliminary report.

Most research on representable matroids has focused on matroids representable over a (commutative) field. In particular, in 1996 Semple and Whittle introduced *partial fields* to study matroids that can be represented over several distinct fields. An important result here is Whittle's classification of the representations of ternary matroids.

In this talk we introduce *skew partial fields*. These generalize partial fields by dropping the requirement that multiplication is commutative. The construction of matroid representations over commutative partial fields relies heavily on determinants, for which there is no straightforward generalization to the noncommutative case. To get around this, we will fall back on the way Tutte treated matroid representation, namely by something he called a *chain group*.

One feature of partial fields is that, whenever a matroid is representable over a partial field, it is also representable over a field. Not so for skew partial fields: we will construct a matroid that is representable over a skew partial field but not over any skew field! Hence skew partial fields provide a proper extension of the notion of representability, while preserving most traditional properties. (Received January 19, 2010)