962-20-1204 **Peter A. Brooksbank** (brooks@geometry.uoregon.edu), Department of Mathematics, University of Oregon, Eugene, OR 97403, and. *Constructive Recognition of the Classical Groups.* Preliminary report.

Let $G = \langle \mathcal{S} \rangle \leq \mathrm{GL}(d, q)$ for $d \geq 2$ and a prime power q, specified by a generating set $\mathcal{S}$ of matrices. The goal is to determine the structure of G efficiently.

Key requirements in an efficient computational analysis of G are the ability to recognise when G is almost simple modulo scalars; to determine the standard name of the simple quotient; and to compute efficiently inside G. From our point of view, the latter amounts to having a fast probabilistic algorithm to construct a given matrix $g \in G$ using elements of $\mathcal{S}$. We present such an algorithm when G is a classical group. The method combines both Lie theoretic information about the classical groups together with probabilistic estimates concerning the generation of certain subgroups and statistics regarding the elements of the group. While the emphasis of the talk is the underlying theory, I am currently implementing the algorithm for incorporation into the computer algebra system GAP.

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