1063-20-206 **Simon D Guest*** (simon_guest@baylor.edu), One Bear Place, #97328, Waco, TX 76798, and **Cheryl E Praeger**. *Proportions of elements of certain orders in classical groups.*

Let G be a finite group. We say that an element g in G has 2-part order 2^j if 2^j is the largest power of 2 dividing the order of g. To analyze recognition algorithms for classical groups, we are sometimes presented with the following question. Take the direct product of two classical groups $A \times B$ and choose a random element (a, b); determine the probability that (a, b) powers up to an element of the form $(z, 1)$, where z is an involution in A. We require that the 2-part order of a be greater than the 2-part order of b. In order to estimate this probability, we first establish lower bounds on the proportion of elements in the symmetric group with a given 2-part order. We will describe the relationship between maximal tori in a classical group and its Weyl group. Since the Weyl group of a classical group involves the symmetric group, we can use the lower bounds for the symmetric group, together with this relationship, to obtain corresponding lower bounds for classical groups of odd characteristic. If A and B have dimension m and $n-m$, and $m \in [n/3, n/2]$ (for example if $A \times B$ is the centralizer of a strong involution), then we show that the probability that (a, b) powers up to $(z, 1)$ is at least an explicit constant. (Received August 16, 2010)