1096-VM-1178 **Kelly Aman***, kelly.aman@mavs.uta.edu. *Determining Properties of Semifields by Investigating Their Cubical Arrays.*

It is well known that a finite semifield, $(S, +, *)$, has p^n elements, for p prime, n a positive integer. Knuth proved that $(S, +)$ can be viewed as an n-dimensional vector space over $GF(p)$, and for any basis, $\{x_1, ..., x_n\}$, of this vector space, $*$ is determined by the $n \times n \times n$ array of scalars, A, satisfying the equation

$$x_i * x_j = \sum_{k=1}^{n} A_{ijk} x_k$$

We will show that two bases define the same cubical array if and only if their associated change of basis transformation is an automorphism of S. The set of all such transformations for a particular cubical array will be isomorphic to $\mathrm{Aut}(S)$. Thus, $\mathrm{Aut}(S)$ can be determined by examining the cubical arrays generated by all possible bases of S. Since this would be a rather ineffeicient method, we will also discuss methods for limiting the number of bases which need to be investigated. If time permits, preliminary results regarding other uses for the set of cubical arrays of a semifield will be presented. (Received September 13, 2013)