1048-22-212 **Aloysius G Helminck*** (loek@math.ncsu.edu), Department of Mathematics, Campus Box 8205, North Carolina State University, Raleigh, NC 27695. *Computing in Symmetric Spaces.*

In the last few decades much of the structure of Lie groups, Lie algebras, and their representations has been implemented in several excellent computer algebra packages. The structure of reductive symmetric spaces and more generally symmetric k-varieties in the case of arbitrary base fields rests on that of the underlying Lie group. Until a few years ago very few algorithms existed for computations in these symmetric spaces, mostly due to the fact that their structure is more complicated then that of the underlying group. For example instead of just 1 root system the study of symmetric k-varieties involves 5 root systems.

In this talk we will give an introduction to symmetric k-varieties, discuss briefly the similarities between the structure of the real symmetric spaces and these symmetric k-varieties and explain for which aspects of the structure there exists algorithms. One aspect of this structure will be discussed in more detail, namely, the orbits of minimal parabolic k-subgroups acting on the symmetric k-variety. These are of fundamental importance in the study of these symmetric k-varieties. For $k = \mathbb{R}$ a characterization of these orbits was given by Matsuki, for $k = \bar{k}$ by Springer and for arbitrary fields by Helminck and Wang. (Received February 08, 2009)