1014-20-1219 **Jennifer Daniel*** (fowler@math.lamar.edu), Department of Mathematics, Lamar University, Beaumont, TX 77710. *Algorithms for reductive symmetric spaces.*

In the last two decades much of the structure of Lie groups and their representations has been implemented in several computer algebra packages, including LiE, GAP4, Chevie, Magma and Maple. The structure of reductive symmetric spaces is very similar to that of the underlying Lie group, with a few additional complications. A computer algebra package enabling one to do computations related to these symmetric spaces would be an important tool for researchers in many areas of mathematics. Until recently only very few algorithms existed for computations in these symmetric spaces. This is not only due to the large number of different types of these symmetric spaces (for a simple Lie group, G, with Lie algebra, $\mathfrak{g}$, there are 88 different types of local real reductive symmetric spaces), but also due to the fact that the algebraic/combinatorial structure of these symmetric spaces is much more complicated. For example it involves the intricate relations of 5 root systems and their Weyl groups instead of just one as in the groups case. We show first that this fine structure can be obtained from the setting of a complex reductive Lie group with a pair of commuting involutions. Then, we outline algorithms for computing the fine structure of these symmetric spaces. (Received September 27, 2005)