# $H$-expansive matrices in indefinite inner product spaces and their invariant subspaces

D. Janse van Rensburg

We considered indefinite inner products given by a square real invertible symmetric matrix $H = H^T : [x, y] = (Hx, y)$. On the Euclidean space equipped with this indefinite inner product, we consider matrices $A$ for which $A^*HA - H$ is nonnegative. Such matrices are called $H$-expansive matrices.

We are interested in the construction of complex (as well as real) $A$-invariant maximal $H$-nonnegative and nonpositive subspaces. The complex case has already been shown if one uses a suitable Cayley transform. The problem arises when $A$ is real and $A^THA - H$ is nonnegative and $A$ has both 1 and -1 as eigenvalues. The uniqueness and stability of these subspaces are also studied.

The talk is based on a joint work with J.H. Fourie, G.J. Groenewald and A.C.M. Ran.