1046-47-884 **Stefan Richter*** (`richter@math.utk.edu`), Department of Mathematics, University of Tennessee, Knoxville, TN 37996, and **Carl Sundberg**. *Extremals for the families of commuting spherical contractions and their adjoints.* Preliminary report.

Let $d \geq 1$ and let $\mathcal{F}$ denote the family of all commuting spherical contractions, i.e. those commuting d-tuples $T = (T_1, .., T_d)$ of Hilbert space operators satisfying $\sum_{j=1}^d T_j^* T_j \leq I$. Then the family of adjoint tuples, $\mathcal{F}^*$, consists of the d-contractions. They satisfy $\| \sum_{j=1}^d T_j x_j \|^2 \leq \sum_{j=1}^d \|x_j\|^2$ for all $x_1, ..., x_d$ in the Hilbert space. An operator tuple S acting on $\mathcal{H}$ is called an extremal for a family $\mathcal{G}$, if and only if the only way to extend S to a tuple $T \in \mathcal{G}$ acting on $\mathcal{K} \supseteq \mathcal{H}$ is by taking direct sums. It is a theorem of Agler that every operator tuple in a family can be extended to an extremal.

We show that the extremals of the spherical contractions $\mathcal{F}$ are of the form $S^* \oplus U$, where S is the d-shift tuple acting on a Drury-Arveson space and U is a spherical unitary tuple. The resulting extension theorem had been known and is due to Mueller-Vasilescu and to Arveson.

It appears to be unknown what the extremals for the d-contractions $\mathcal{F}^*$ are. We characterize all extremals T of $\mathcal{F}^*$ which satisfy that the defect operator $I - \sum_{j=1}^d T_j T_j^*$ has rank zero or one. (Received September 12, 2008)