1014-15-76 **Sundaresan Kondagunta***, Department of Mathematics, 2121 Euclid Ave., Cleveland, OH 44115. *θ -Frames in R^n.* Preliminary report.

Let $0 < \theta < \pi$ and $(R^n, \| \|)n \geq 2$, be the Euclidean space with the standard inner product coordinatized by the standard basis. **Definition.** A θ-frame in R^n, $n \geq 2$ is an ordered basis of R^n, $\{\vec{x}_i\}_{i=1}^n$, $n \geq 2$, such that $\|\vec{x}_i\| = 1$, $1 \leq i \leq n$, and $(\vec{x}_i, \vec{x}_j) = cos\theta$, $i \neq j$. It is clear every θ-fram F_θ is canonically associated with a unique $n \times n$ matrix F'_θ.
Theorem 1 A θ-frame in R^n, $n \geq 2$ exists if and only if $cos\theta > -\frac{1}{(n-1)}$
Theorem 2 If $m > n$, each θ-frame in R^n admits an extension to a θ-frame in R^m, R^m if $cos\theta > -\frac{1}{(m-1)}$.
Theorem 3 For each θ, $cos\theta > -frac1(n-1)$, there is a unique frame s_θ such that the matrix s_θ^1 is positive definite. The matrix of a θ-frame is normal if and only if the transpose of the matrix is associated with a θ-frame.

Several interesting geometric properties of θ-frames are obtained.

The motivation of the investigation arose in answering a problem on θ-frames in R^3 raised by an engineer. (Received July 19, 2005)