Laura Anderson and Beata Randrianantoanina* (randrib@miamioh.edu). Maximal equilateral sets in finite dimensional Petty spaces. Preliminary report.

A subset $S$ of a normed space $(X, \| \cdot \|)$ is called equilateral if the distance between any two points of $S$ is the same. We denote by $e(X)$ the largest size of an equilateral set in $X$. There has been a lot of work to estimate the value of $e(X)$ for various spaces, but many questions remain open. In particular, a conjecture that $e(\ell_p^n) = n + 1$, for all $2 < p < \infty$, is open. In 1977 Petty proved that if $\dim X \geq 3$ then any equilateral set in $X$ of size 3 can be extended to an equilateral set of size 4. Petty also showed that the space $\mathbb{R}^n$ with the norm

$$
\|(x_1, \ldots, x_n)\|_{Petty} := |x_1| + \left( \sum_{i=2}^{n} |x_i|^2 \right)^{\frac{1}{2}}
$$

contains a maximal equilateral set $S$ of size 4, that is the set $S$ cannot be extended to a larger equilateral set. Note that the space $(\mathbb{R}^n, \| \cdot \|_{Petty})$ also contains an equilateral set of size $(n + 1)$. In 2004 Swanepoel asked what is the value of $e(\mathbb{R}^n, \| \cdot \|_{Petty})$. In this talk I will describe possible sizes of maximal equilateral sets in $(\mathbb{R}^n, \| \cdot \|_{Petty})$. In particular, we show that $e(\mathbb{R}^n, \| \cdot \|_{Petty}) \geq n + 2$, for $3 \leq n \leq 10$.

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