1126-05-360 **Wei-Hsuan Yu*** (u690604@gmail.com), 619 Red Cedar Rd, east lansing, MI 48862, and **Alexey Glazyrin**. *New bounds for equiangular lines and spherical two-distance sets.*

The set of points in a metric space is called an s-distance set if pairwise distances between these points admit only s distinct values. Two-distance spherical sets with the set of scalar products $\{\alpha, -\alpha\}$, $\alpha \in [0,1)$, are called equiangular. The problem of determining the maximal size of s-distance sets in various spaces has a long history in mathematics. We determine a new method of bounding the size of an s-distance set in two-point homogeneous spaces via zonal spherical functions. This method allows us to prove that the maximum size of a spherical two-distance set in $\mathbb{R}^n$ is $\frac{n(n+1)}{2}$ with possible exceptions for some $n = (2k+1)^2 - 3$, $k \in \mathbb{N}$. We also prove the universal upper bound $\sim \frac{2}{3}na^2$ for equiangular sets with $\alpha = \frac{1}{a}$ and, employing this bound, prove a new upper bound on the size of equiangular sets in an arbitrary dimension. Finally, we classify all equiangular sets reaching this new bound. (Received January 17, 2017)