

This work deals with the study of bisectors (i.e. sets of points of equal distance from two given points) and the impact of their shape on the shape of the unit ball. It is known that if each bisector of two antipodal points on the sphere of a normed linear space lies in a hyperplane, then the norm is an inner product norm (for a special case of norm in \mathbb{R}^2 it is proved in Theorem 18). Here we generalise this statement in \mathbb{R}^2 for the case of (a priori) non-symmetric unit ball. In particular, we show that if the set of points x in the unit sphere, such that the bisector of x and $-x$ is a line, has non-empty interior with respect to the sphere and the sphere is smooth, then the unit sphere is an ellipse centred at the origin. The work is based on the preprint [1].