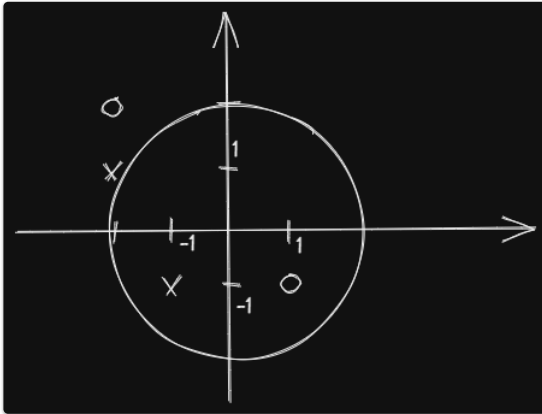# 1. Classification

No such classifier exists.

As seen from the diagram, since the positive example $(-1, -1)$ and negative example $(1, -1)$ are equidistant from the origin, there is no possible r that will result in either example being on the inside or outside of an origin-centred circle with radius r.

No such classifier exists.

Since negative examples $(1, -1)$ and $(-2, 2)$ lie on the same line $y = -x$ through the origin, it is impossible to obtain a $\theta \in \mathbb{R}^2$ such that both negative examples appear on the same side of the decision boundary.