

Problem 3.2. *Solution.* It appears that if you graph the first and second columns in A , we see that they're perpendicular. Additionally, if we take the norms of the columns, we see that the norms equal 1:

$$\begin{aligned}\sqrt{\left(\frac{-\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2} &= \sqrt{\frac{2}{4} + \frac{2}{4}} \\ &= 1 \\ \sqrt{\left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2} &= \sqrt{\frac{2}{4} + \frac{2}{4}} \\ &= 1.\end{aligned}$$

Since A is a square matrix, then we have that A is an orthogonal matrix.