

FMCS 1-Maths 06/07: Assignment 1

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Matrix transformations and distances

- a) Write down the matrix R for a rotation in two dimensions over an angle of $\pi/4$. Check that the determinant of the matrix equals one.
- b) Given two vectors $\mathbf{u} = (\mathbf{0}, \mathbf{1})$ and $\mathbf{v} = (2, 2)$. Calculate the length of the vectors and their distance, using the Euclidian distance, the Manhattan distance and the chess board distance.
- c) Calculate $R\mathbf{u}$ and $R\mathbf{v}$, sketch the original vectors and the transformed ones.
- d) Calculate the length of the transformed vectors, and their distance using the three methods used above. Which distance is invariant under the rotation?