

Math 782 Hw4

due Tuesday 02/13/2018

1. P is a projector. Prove that the eigenvalues of P are either 1 or 0.
2. Prove that if P is an orthogonal projector, then $I - 2P$ is unitary.
3. Let

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ 1 & 0 \end{bmatrix} \quad x = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}.$$

What is the orthogonal projector P onto $\text{range}(A)$, and what is the Px , the image under P of the vector x ? Same questions for B .