

$$H = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$$

$$H^{-1} = H^T = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$$

$$A = dwt^{-1}(dwt(A)) = H^T \cdot H \cdot A = E \cdot A = A$$

$$A = \left( \begin{array}{ccc|c} 1 & 2 & 4 & 0 \\ 3 & 7 & 5 & 0 \end{array} \right) \rightarrow A' = \left( \begin{array}{cccc} 1 & 2 & 4 & 0 \\ 3 & 7 & 5 & 0 \end{array} \right)$$

$$H \cdot A' = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 2 & 4 & 0 \\ 3 & 7 & 5 & 0 \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 4 & 9 & 9 & 0 \\ 2 & 5 & 1 & 0 \end{pmatrix}$$

$$H^{-1} \cdot H \cdot A' = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix} \cdot \begin{pmatrix} 4 & 9 & 9 & 0 \\ 2 & 5 & 1 & 0 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 2 & 4 & 8 & 0 \\ 6 & 14 & 10 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 2 & 4 & 0 \\ 3 & 7 & 5 & 0 \end{pmatrix} = A'$$

$$A' = \left( \begin{array}{ccc|c} 1 & 2 & 4 & 0 \\ 3 & 7 & 5 & 0 \end{array} \right) \rightarrow A = \begin{pmatrix} 1 & 2 & 4 \\ 3 & 7 & 5 \end{pmatrix}$$