

Exercise : Basis Function and quantization

(b)(i) Q similar and difference

Solution

Similarity: both basis functions have increasing horizontal, vertical and diagonal frequencies

difference: the new scheme uses 4×4 DCT that consists of 16 different types of basis functions where the baseline JPEG uses 8×8 DCT that consists of 64 different types of basis functions

(ii) Q quantization table

Solution $Q = \begin{bmatrix} 10 & 20 & 30 & 40 \\ 20 & 30 & 40 & 50 \\ 30 & 40 & 50 & 60 \\ 40 & 50 & 60 & 70 \end{bmatrix}$

The quantization table should be 4×4 with increasing step size in the horizontal

vertical and diagonal direction,
This is reduce quantization errors
for the DC and low AC coefficients
as their DCT values are large
and human are more sensitive
to error/distortion in them