



Tema 4.1: K-Nearest
PRACTICA5
BASE DE DATOS: ZIP

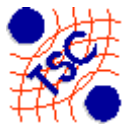
**Métodos transformados para la compresión de
imagen**

Febrero-Mayo 2004



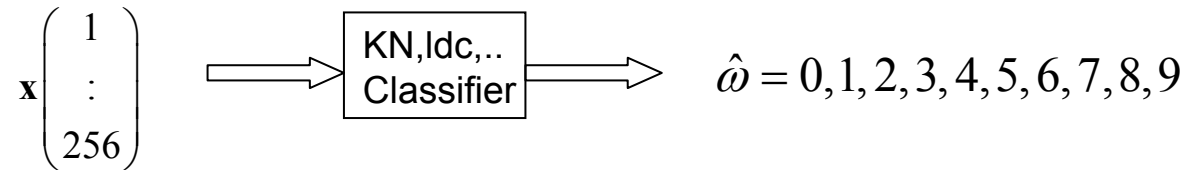
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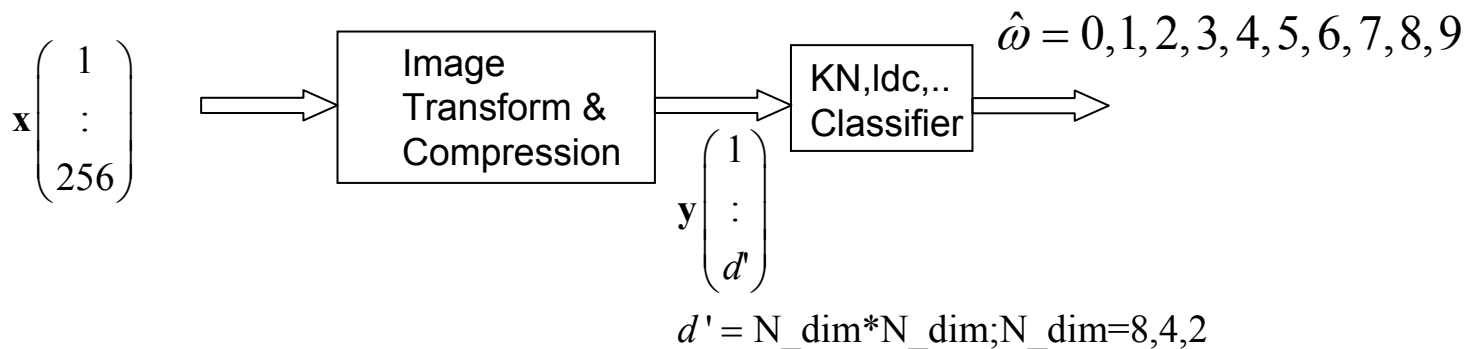


Esquema práctica

Parte 1: prac5_zip.m



Parte 2: prac5_ztl.m





TRANSFORMADA EN 2 DIMENSIONES

- Matriz (Imagen)

$$\mathbf{X} = \begin{pmatrix} x(1,1) & x(1,2) & \vdots & x(1,N) \\ x(2,1) & x(2,2) & \vdots & x(2,N) \\ \vdots & \vdots & \vdots & \vdots \\ x(N,1) & x(N,2) & \vdots & x(N,N) \end{pmatrix}$$

- Transformada (matriz de transformación es unitaria)

$$\mathbf{Y} = \mathbf{A}^T \mathbf{X} \mathbf{A} \quad \mathbf{I} = \mathbf{A}^T \mathbf{A}$$

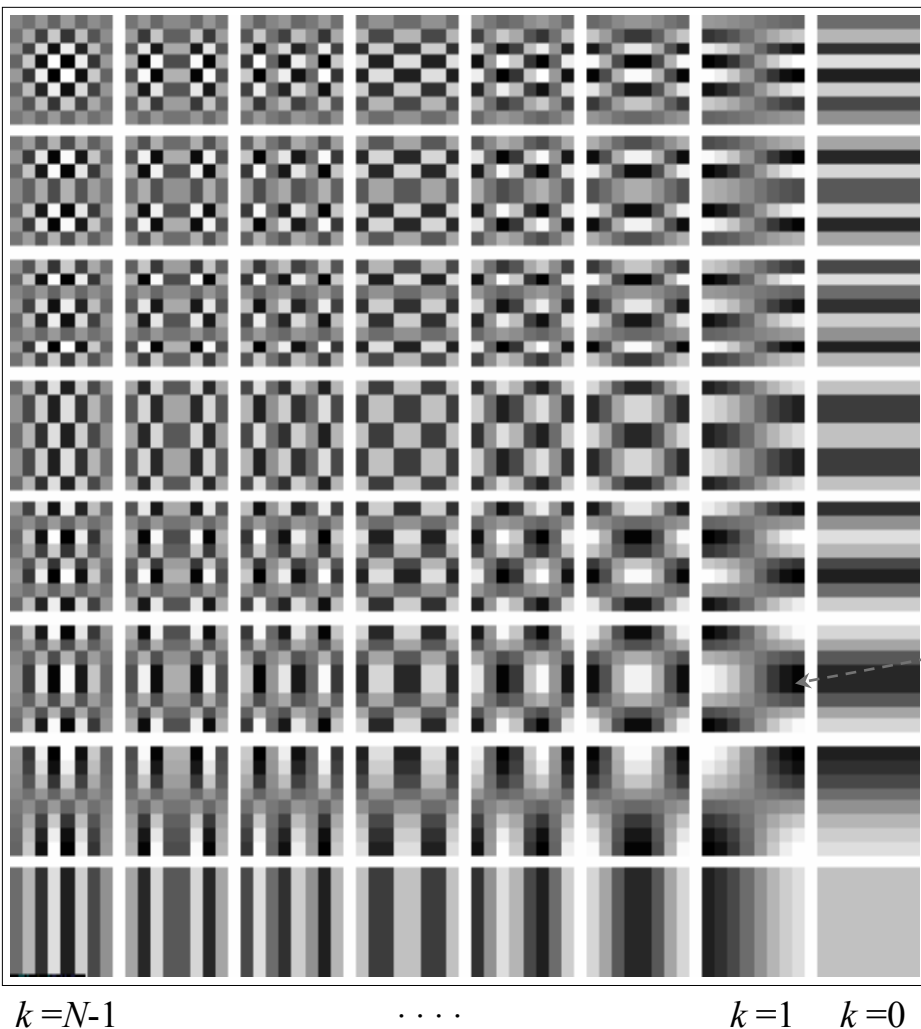
$$y(k,l) = \sum_{n=1}^N \sum_{m=1}^N x(n,m) a_k(n) a_l(m)$$

- Funciones Base

$$\mathbf{A} = \begin{pmatrix} a_1(1) & a_2(1) & \vdots & a_N(1) \\ a_1(2) & a_2(2) & \vdots & a_N(2) \\ \vdots & \vdots & \vdots & \vdots \\ a_1(N) & a_2(N) & \vdots & a_N(N) \end{pmatrix}$$



TRANSFORMADA COSENO DISCRETA



$l=N-1$

$$a_k(m) = \sqrt{\frac{s}{N}} \cos\left(\frac{(2m+1)k\pi}{2N}\right) \quad s = \begin{cases} 2 & k=1, \dots, N-1 \\ 1 & k=0 \end{cases}$$

$$A_{k,l}(m,n) = a_k(m)a_l(n)$$

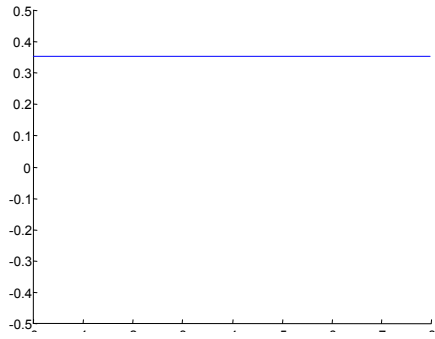
$l=1$

$l=0$

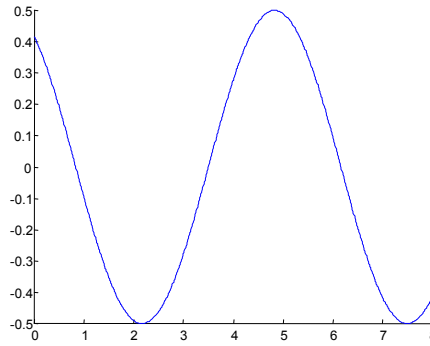
**Funciones base
de la DCT ($N=8$)**



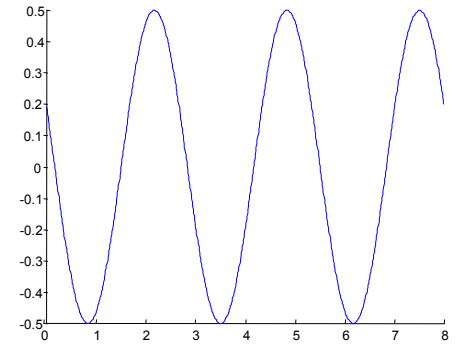
Funciones base de la DCT



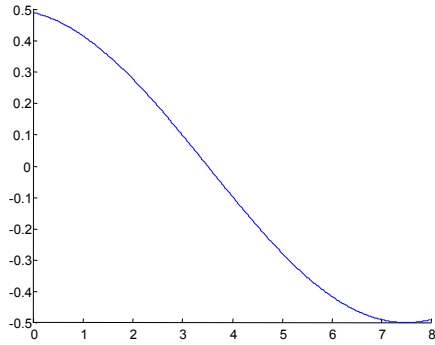
$a_0(n)$



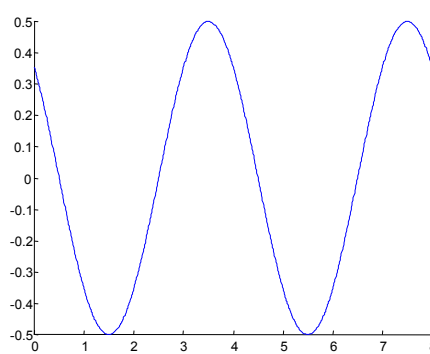
$a_3(n)$



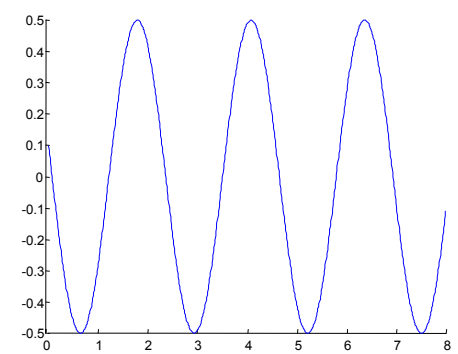
$a_6(n)$



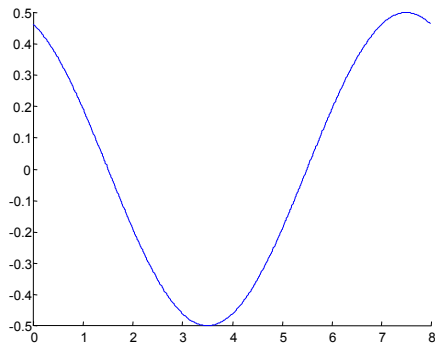
$a_1(n)$



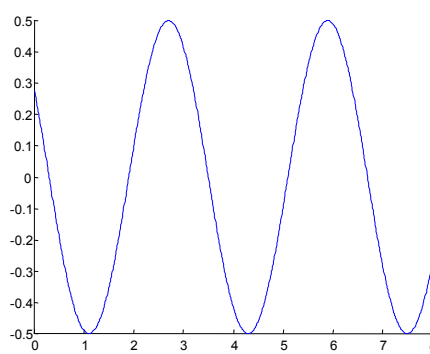
$a_4(n)$



$a_7(n)$



$a_2(n)$



$a_5(n)$

$N=8$



TRANSFORMADA HADAMARD

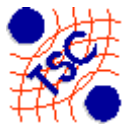
- Matrices de Transformación $N=2^L$

$$\mathbf{A}_2 = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$$

- Ejemplo ($N=8$) \mathbf{A}_8

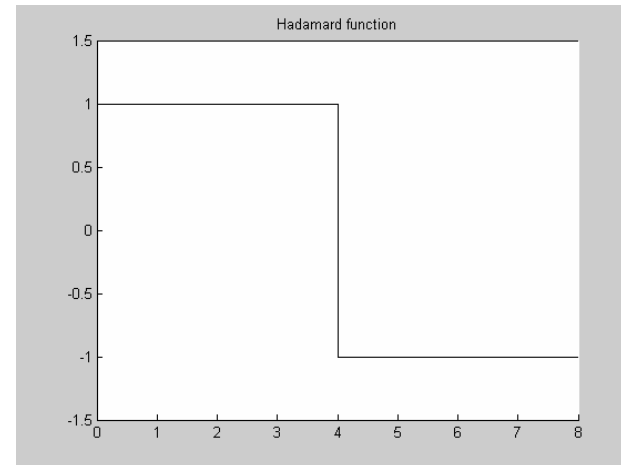
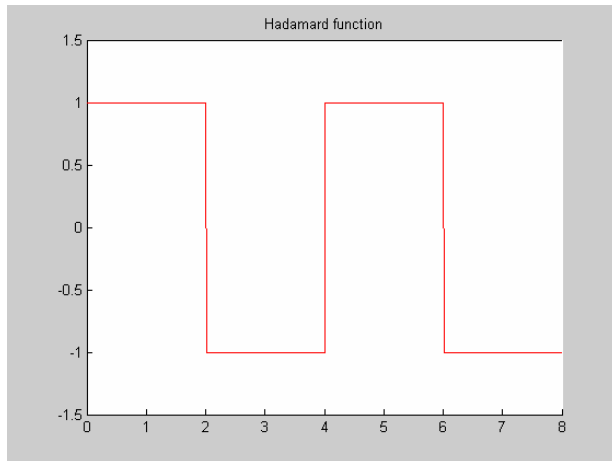
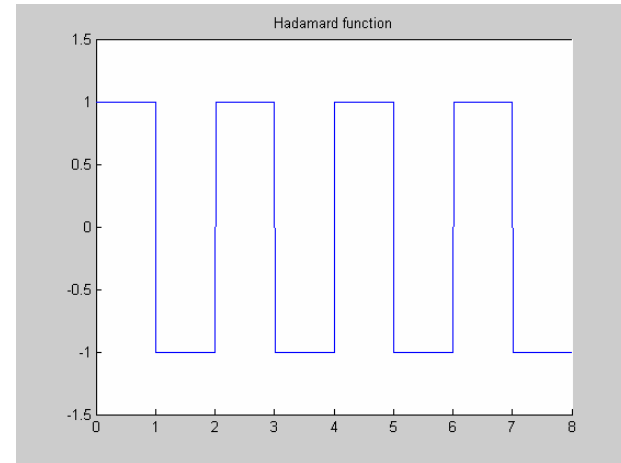
$$\mathbf{A}_2 = \frac{1}{\sqrt{2}} \begin{pmatrix} \mathbf{A}_{N/2} & \mathbf{A}_{N/2} \\ \mathbf{A}_{N/2} & -\mathbf{A}_{N/2} \end{pmatrix}$$

1	1	1	1	1	1	1	1
1	-1	1	-1	1	-1	1	-1
1	1	-1	-1	1	1	-1	-1
1	-1	-1	1	1	-1	-1	1
1	1	1	1	-1	-1	-1	-1
1	-1	1	-1	-1	1	-1	1
1	1	-1	-1	-1	-1	1	1
1	-1	-1	1	-1	1	1	-1



TRANSFORMADA HADAMARD

- Ejemplo Funciones
($N=8$) A_8





EJEMPLO

Reducción de 256 a 64 Coeficientes a partir de la DCT

