

diverse DFT-Matrizen

$$N := 16 \quad n := 0..N - 1$$

$$\varepsilon := e^{\frac{-j \cdot 2 \cdot \pi}{N}}$$

$$u := 0..N - 1 \quad \varepsilon = 0.924 - 0.383j$$

$$v := 0..N - 1 \quad |\varepsilon| = 1 \quad \text{Elementarzeiger}$$

$$\text{DFT16}_{u,v} := \varepsilon^{u \cdot v} \quad \arg(\varepsilon) = -0.393 \quad \text{oder } -22,5^\circ$$

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0.92-0.38j	0.71-0.71j	0.38-0.92j	-1j	-0.38-0.92j	-0.71-0.71j	-0.92-0.38j	-1	-0.92+0.38j	-0.71+0.71j	-0.38+0.92j	1j	0.38+0.92j	0.71+0.71j	0.92+0.38j
2	1	0.71-0.71j	-1j	-0.71-0.71j	-1	-0.71+0.71j	1j	0.71+0.71j	1	0.71-0.71j	-1j	-0.71-0.71j	-1	-0.71+0.71j	1j	0.71+0.71j
3	1	0.38-0.92j	-0.71-0.71j	-0.92+0.38j	1j	0.92+0.38j	0.71-0.71j	-0.38-0.92j	-1	-0.38+0.92j	0.71+0.71j	0.92-0.38j	-1j	-0.92-0.38j	-0.71+0.71j	0.38+0.92j
4	1	-1j	-1	1j	1	-1j	-1	1j	1	-1j	-1	1j	1	-1j	-1	1j
5	1	-0.38-0.92j	-0.71+0.71j	0.92+0.38j	-1j	-0.92+0.38j	0.71+0.71j	0.38-0.92j	-1	0.38+0.92j	0.71-0.71j	-0.92-0.38j	1j	0.92-0.38j	-0.71-0.71j	-0.38+0.92j
6	1	-0.71-0.71j	1j	0.71-0.71j	-1	0.71+0.71j	-1j	-0.71+0.71j	1	-0.71-0.71j	1j	0.71-0.71j	-1	0.71+0.71j	-1j	-0.71+0.71j
7	1	-0.92-0.38j	0.71+0.71j	-0.38-0.92j	1j	0.38-0.92j	-0.71+0.71j	0.92-0.38j	-1	0.92+0.38j	-0.71-0.71j	0.38+0.92j	-1j	-0.38+0.92j	0.71-0.71j	-0.92+0.38j
8	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1
9	1	-0.92+0.38j	0.71-0.71j	-0.38+0.92j	-1j	0.38+0.92j	-0.71-0.71j	0.92+0.38j	-1	0.92-0.38j	-0.71+0.71j	0.38-0.92j	1j	-0.38-0.92j	0.71+0.71j	-0.92-0.38j
10	1	-0.71+0.71j	-1j	0.71+0.71j	-1	0.71-0.71j	1j	-0.71-0.71j	1	-0.71+0.71j	-1j	0.71+0.71j	-1	0.71-0.71j	1j	-0.71-0.71j
11	1	-0.38+0.92j	-0.71-0.71j	0.92-0.38j	1j	-0.92-0.38j	0.71-0.71j	0.38+0.92j	-1	0.38-0.92j	0.71+0.71j	-0.92+0.38j	-1j	0.92+0.38j	-0.71+0.71j	-0.38-0.92j
12	1	1j	-1	-1j	1	1j	-1	-1j	1	1j	-1	-1j	1	1j	-1	-1j
13	1	0.38+0.92j	-0.71+0.71j	-0.92-0.38j	-1j	0.92-0.38j	0.71+0.71j	-0.38+0.92j	-1	-0.38-0.92j	0.71-0.71j	0.92+0.38j	1j	-0.92+0.38j	-0.71-0.71j	0.38-0.92j
14	1	0.71+0.71j	1j	-0.71+0.71j	-1	-0.71-0.71j	-1j	0.71-0.71j	1	0.71+0.71j	1j	-0.71+0.71j	-1	-0.71-0.71j	-1j	0.71-0.71j
15	1	0.92+0.38j	0.71+0.71j	0.38+0.92j	1j	-0.38+0.92j	-0.71+0.71j	-0.92+0.38j	-1	-0.92-0.38j	-0.71-0.71j	-0.38-0.92j	-1j	0.38-0.92j	0.71-0.71j	0.92-0.38j

$N := 8$ $n := 0..N - 1$

$$\epsilon := e^{\frac{-j \cdot 2 \cdot \pi}{N}}$$

$u := 0..N - 1$ $\epsilon = 0.707 - 0.707j$
 $v := 0..N - 1$ $|\epsilon| = 1$ **Elementarzeiger**
DFT8_{u,v} := $\epsilon^{u \cdot v}$ $\arg(\epsilon) = -0.785$ oder -45°

$$\text{DFT8} = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0.71 - 0.71i & -1i & -0.71 - 0.71i & -1 & -0.71 + 0.71i & 1i & 0.71 + 0.71i \\ 1 & -1i & -1 & 1i & 1 & -1i & -1 & 1i \\ 1 & -0.71 - 0.71i & 1i & 0.71 - 0.71i & -1 & 0.71 + 0.71i & -1i & -0.71 + 0.71i \\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 \\ 1 & -0.71 + 0.71i & -1i & 0.71 + 0.71i & -1 & 0.71 - 0.71i & 1i & -0.71 - 0.71i \\ 1 & 1i & -1 & -1i & 1 & 1i & -1 & -1i \\ 1 & 0.71 + 0.71i & 1i & -0.71 + 0.71i & -1 & -0.71 - 0.71i & -1i & 0.71 - 0.71i \end{bmatrix}$$

$$\text{DFT8}^{-1} = \begin{bmatrix} 0.13 & 0.12 & 0.12 & 0.13 & 0.13 & 0.13 & 0.12 & 0.12 \\ 0.12 & 0.09 + 0.09i & 0.13i & -0.09 + 0.09i & -0.12 & -0.09 - 0.09i & -0.13i & 0.09 - 0.09i \\ 0.12 & 0.13i & -0.12 & -0.12i & 0.13 & 0.12i & -0.13 & -0.13i \\ 0.13 & -0.09 + 0.09i & -0.12i & 0.09 + 0.09i & -0.12 & 0.09 - 0.09i & 0.12i & -0.09 - 0.09i \\ 0.13 & -0.12 & 0.13 & -0.13 & 0.12 & -0.13 & 0.12 & -0.12 \\ 0.13 & -0.09 - 0.09i & 0.12i & 0.09 - 0.09i & -0.13 & 0.09 + 0.09i & -0.13i & -0.09 + 0.09i \\ 0.13 & -0.13i & -0.13 & 0.13i & 0.12 & -0.13i & -0.12 & 0.13i \\ 0.12 & 0.09 - 0.09i & -0.13i & -0.09 - 0.09i & -0.12 & -0.09 + 0.09i & 0.13i & 0.09 + 0.09i \end{bmatrix}$$

$N := 4$ $n := 0..N - 1$

$$\epsilon := e^{\frac{-j \cdot 2 \cdot \pi}{N}}$$

$u := 0..N - 1$ $\epsilon = -j$
 $v := 0..N - 1$ $|\epsilon| = 1$ **Elementarzeiger**
DFT4_{u,v} := $\epsilon^{u \cdot v}$ $\arg(\epsilon) = -1.571$ oder -90°

$$\text{DFT4} = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -1i & -1 & 1i \\ 1 & -1 & 1 & -1 \\ 1 & 1i & -1 & -1i \end{bmatrix}$$

$$\text{DFT4}^{-1} = \begin{bmatrix} 0.25 & 0.25 & 0.25 & 0.25 \\ 0.25 & 0.25j & -0.25 & -0.25j \\ 0.25 & -0.25 & 0.25 & -0.25 \\ 0.25 & -0.25j & -0.25 & 0.25j \end{bmatrix}$$