

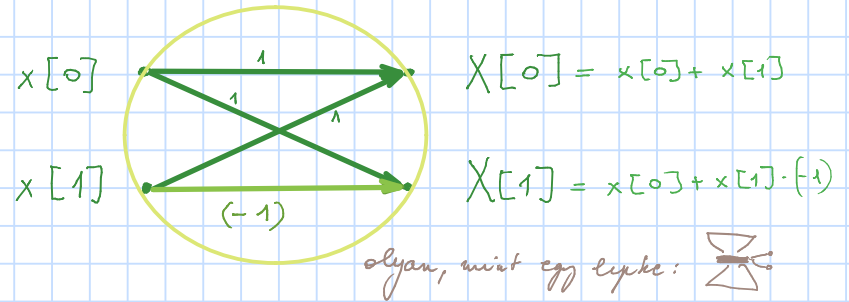
GYORS FOURIER-TRANSZFORMÁCIÓ: LEPKE

A kétkelemű diszkrét Fourier-transzformáció:

$$X[k] = \sum_{n=0}^N x[n] \cdot e^{-j\frac{2\pi}{N} \cdot n \cdot k} \quad N=2\text{-re} \quad k=0 \text{ vagy } k=1$$

$$X[0] = x[0] \cdot e^{-j\frac{2\pi}{2} \cdot 0 \cdot 0} + x[1] \cdot e^{-j\frac{2\pi}{2} \cdot 1 \cdot 0} = x[0] + x[1]$$

$$X[1] = x[0] \cdot e^{-j\frac{2\pi}{2} \cdot 0 \cdot 1} + x[1] \cdot e^{-j\frac{2\pi}{2} \cdot 1 \cdot 1} = x[0] + (-1) \cdot x[1]$$

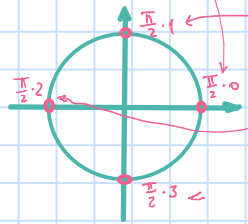


A négykelemű: $N=4$ $n, k = 0, 1, 2, 3$

$$X[0] = x[0] \cdot e^{-j\frac{2\pi}{4} \cdot 0 \cdot 0} + x[1] \cdot e^{-j\frac{2\pi}{4} \cdot 0 \cdot 1} + x[2] \cdot e^{-j\frac{2\pi}{4} \cdot 0 \cdot 2} + x[3] \cdot e^{-j\frac{2\pi}{4} \cdot 0 \cdot 3} =$$

$$= x[0] + x[1] + x[2] + x[3] = (x[0] + x[2]) + (x[1] + x[3])$$

$$X[1] = x[0] \cdot e^{-j\frac{2\pi}{4} \cdot 1 \cdot 0} + x[1] \cdot e^{-j\frac{2\pi}{4} \cdot 1 \cdot 1} + x[2] \cdot e^{-j\frac{2\pi}{4} \cdot 1 \cdot 2} + x[3] \cdot e^{-j\frac{2\pi}{4} \cdot 1 \cdot 3} =$$



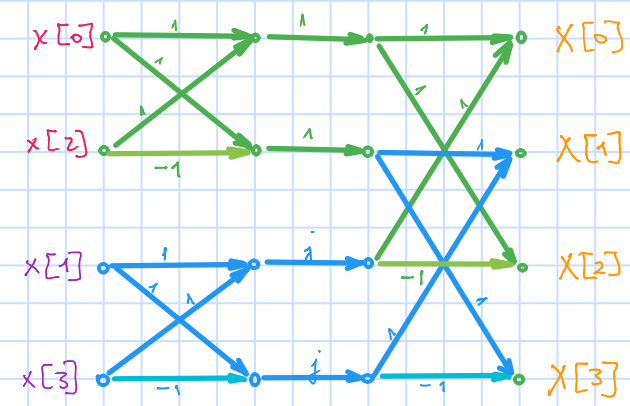
$$= x[0] \cdot 1 + x[1] \cdot j + x[2] \cdot (-1) + x[3] \cdot (-j) =$$

$$= x[0] + x[2] \cdot (-1) + j \cdot (x[1] + x[3] \cdot (-1))$$

$$X[2] = x[0] \cdot e^{-j\frac{2\pi}{4} \cdot 2 \cdot 0} + x[1] \cdot e^{-j\frac{2\pi}{4} \cdot 2 \cdot 1} + x[2] \cdot e^{-j\frac{2\pi}{4} \cdot 2 \cdot 2} + x[3] \cdot e^{-j\frac{2\pi}{4} \cdot 2 \cdot 3} =$$

$$= x[0] + x[1] \cdot (-1) + x[2] + x[3] \cdot (-1) = (x[0] + x[2]) + (x[1] + x[3]) \cdot (-1)$$

$$X[3] = x[0] + x[1] \cdot (-j) + x[2] \cdot (-1) + x[3] \cdot j = (x[0] + x[2] \cdot (-1)) + j \cdot (x[1] + x[3] \cdot (-1)) \cdot (-1)$$



SORREND

0:	00	→	00	:	0
1:	01	→	10	:	2
2:	10	→	01	:	1
3:	11	→	11	:	3

Bitel fordított sorrendben