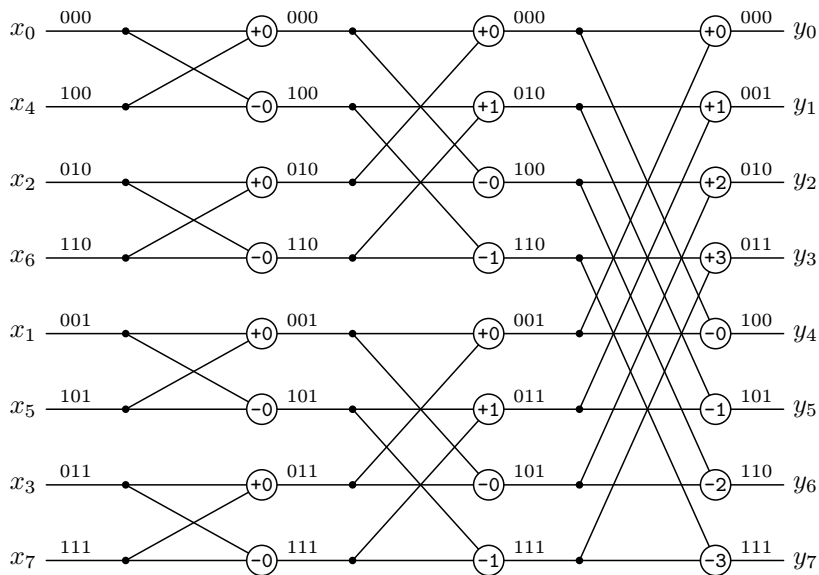
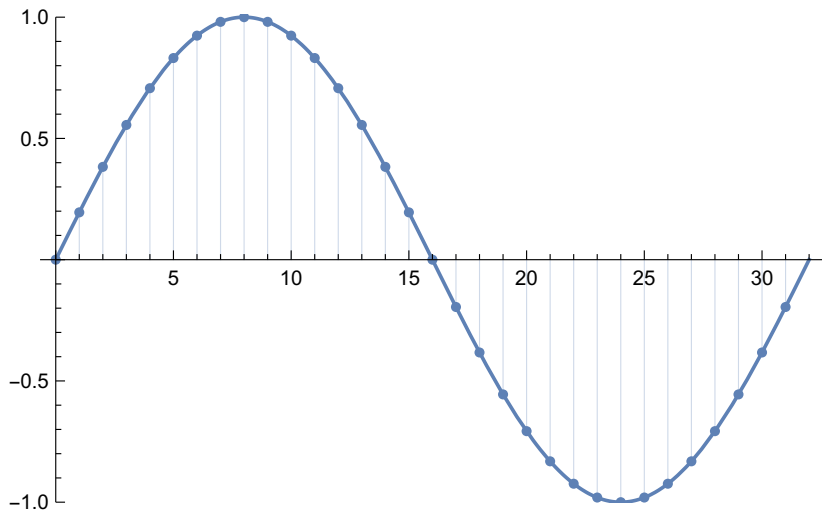


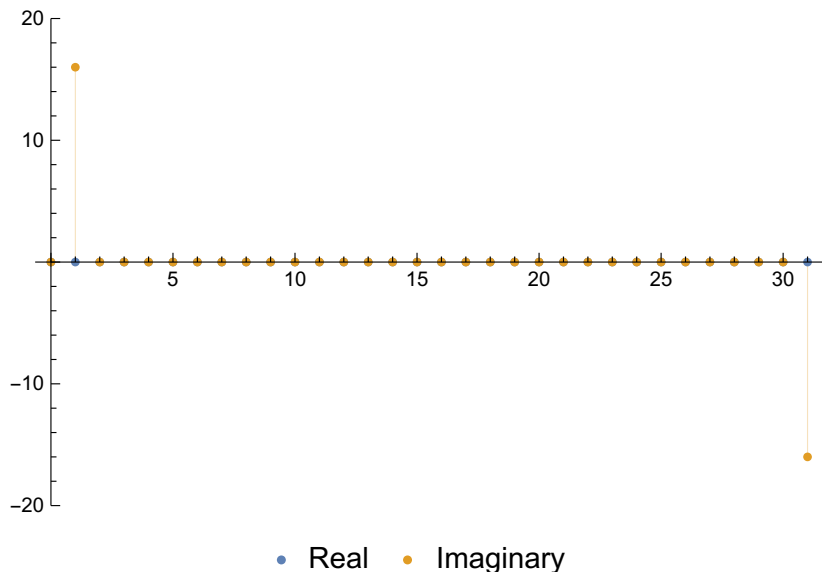
Obvod pro FFT



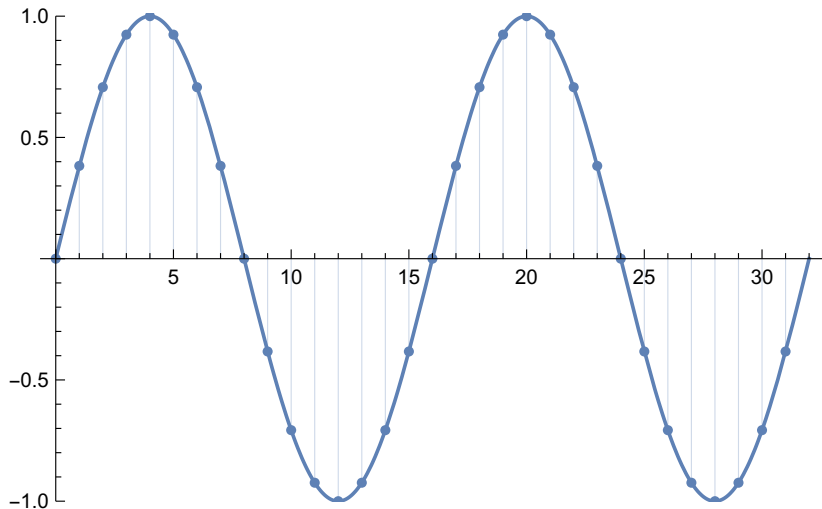
$\sin(x)$ vzorkovaný v 32 bodech



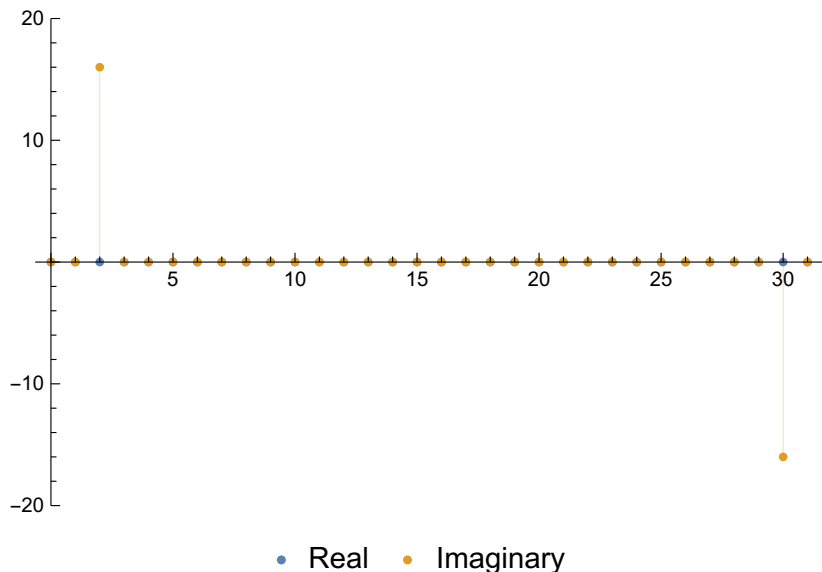
Fourierova transformace 32-bodového $\sin(x)$



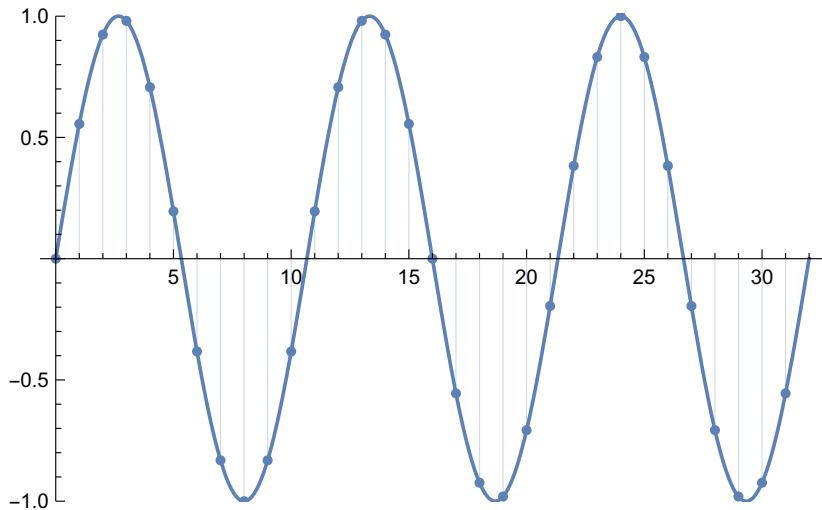
$\sin(2x)$ vzorkovaný v 32 bodech



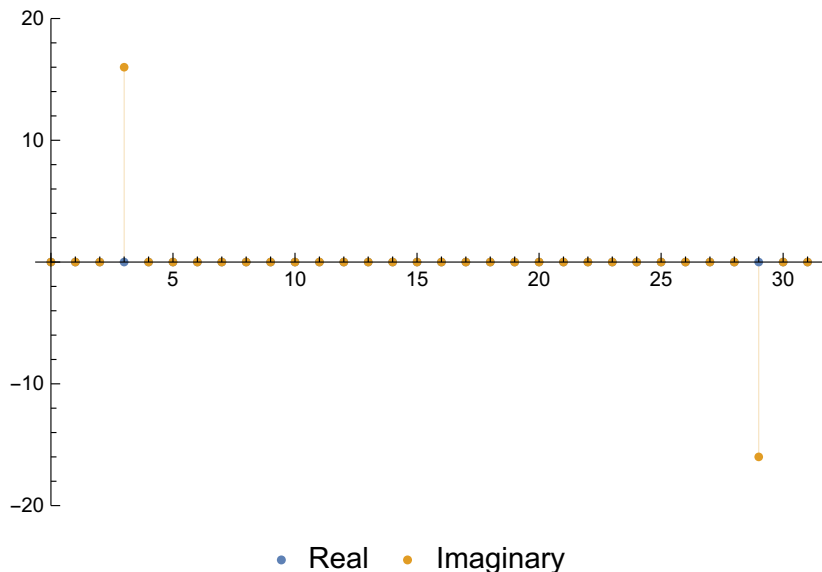
Fourierova transformace 32-bodového $\sin(2x)$



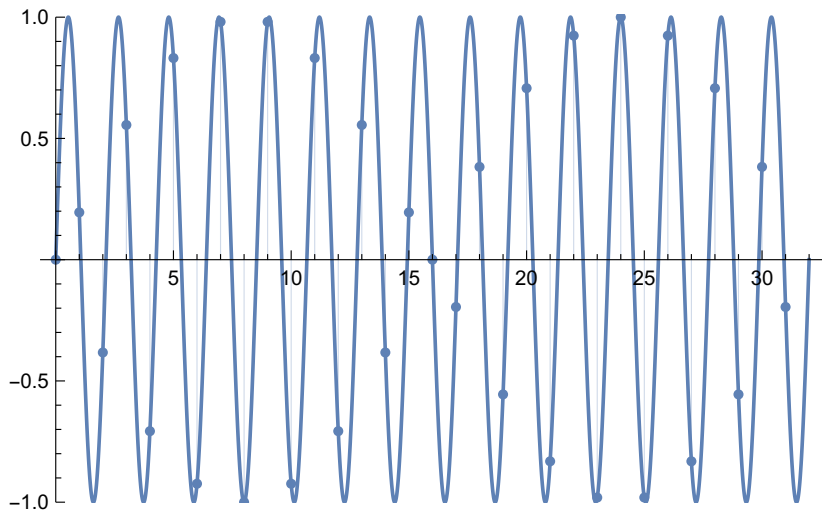
$\sin(3x)$ vzorkovaný v 32 bodech



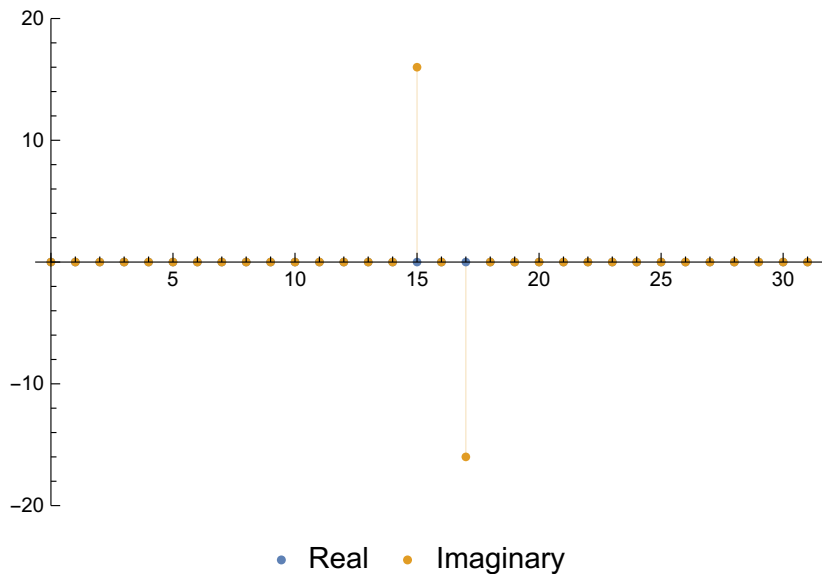
Fourierova transformace 32-bodového $\sin(3x)$



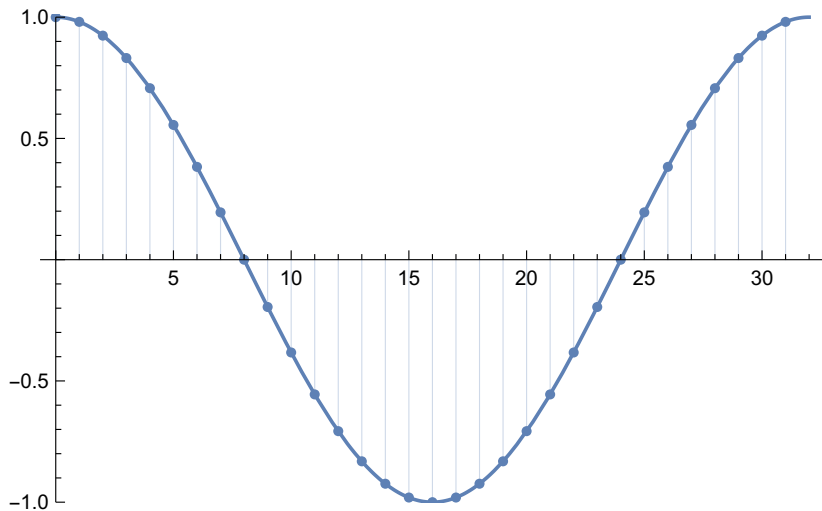
$\sin(15x)$ vzorkovaný v 32 bodech



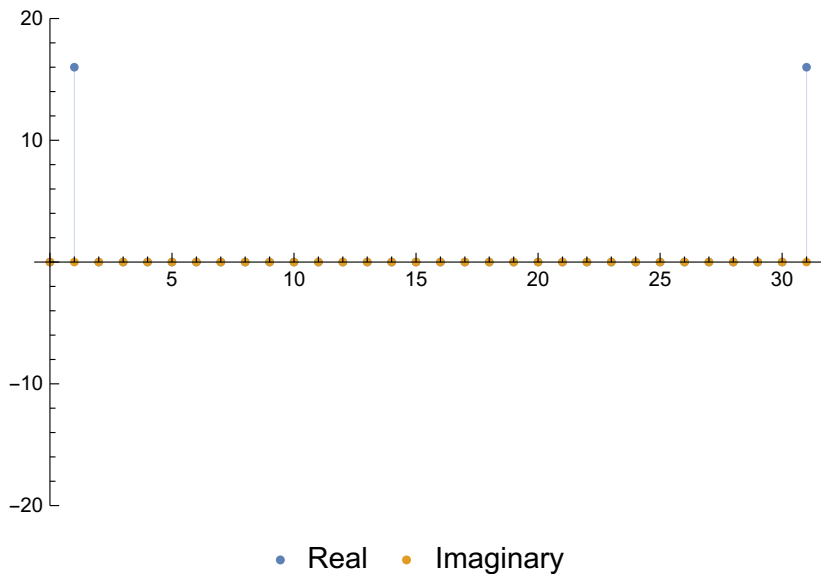
Fourierova transformace 32-bodového $\sin(15x)$



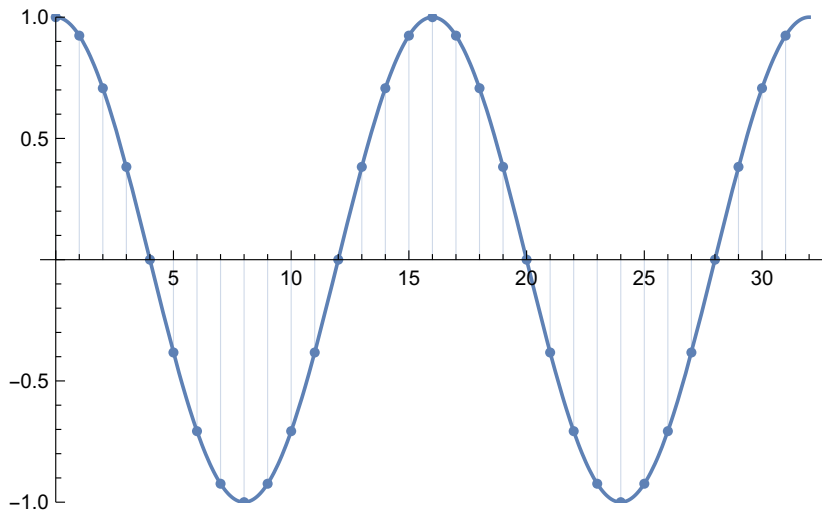
$\cos(x)$ vzorkovaný v 32 bodech



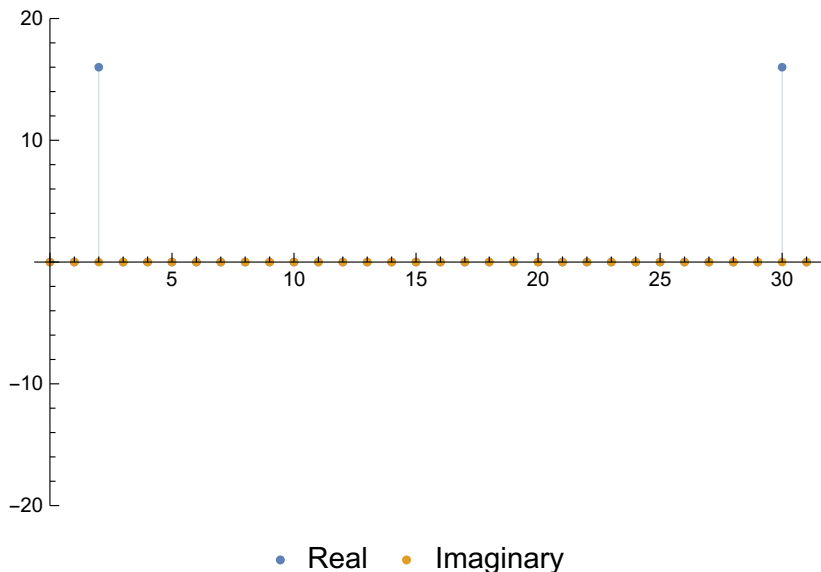
Fourierova transformace 32-bodového $\cos(x)$



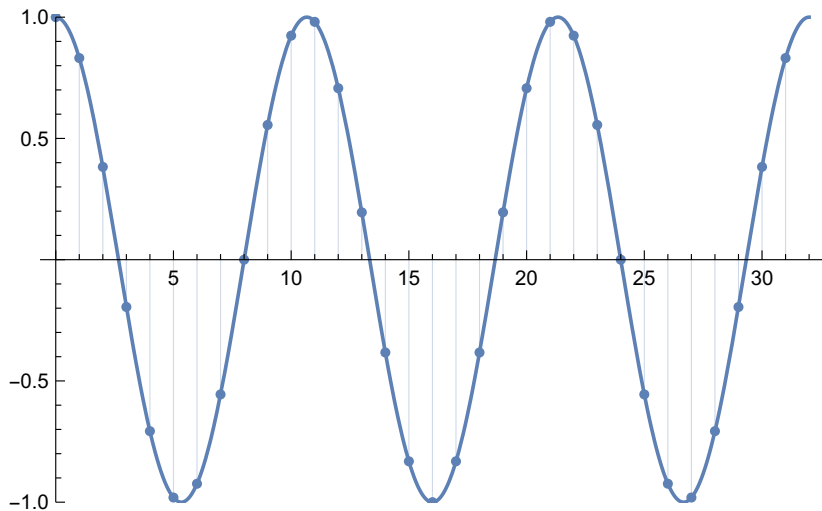
$\cos(2x)$ vzorkovaný v 32 bodech



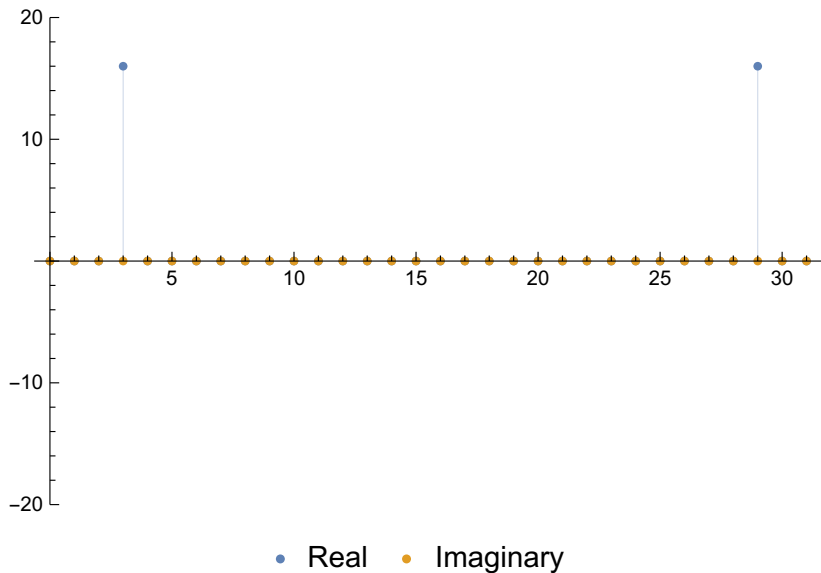
Fourierova transformace 32-bodového $\cos(2x)$



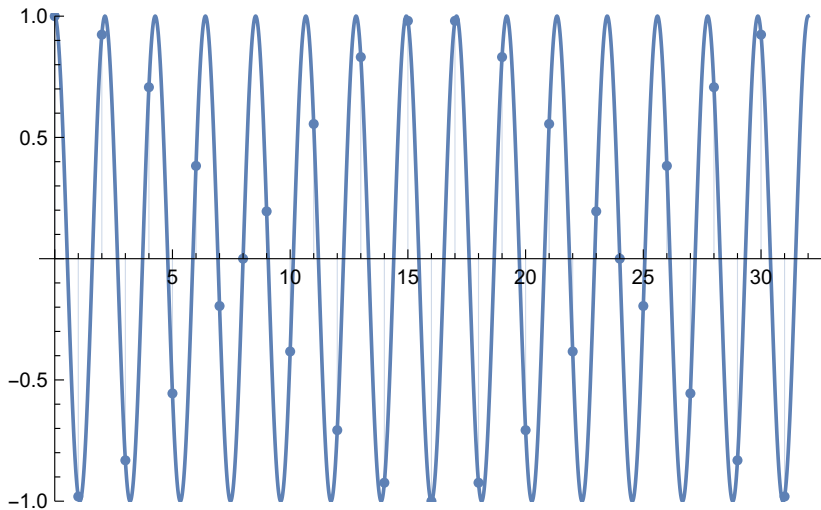
$\cos(3x)$ vzorkovaný v 32 bodech



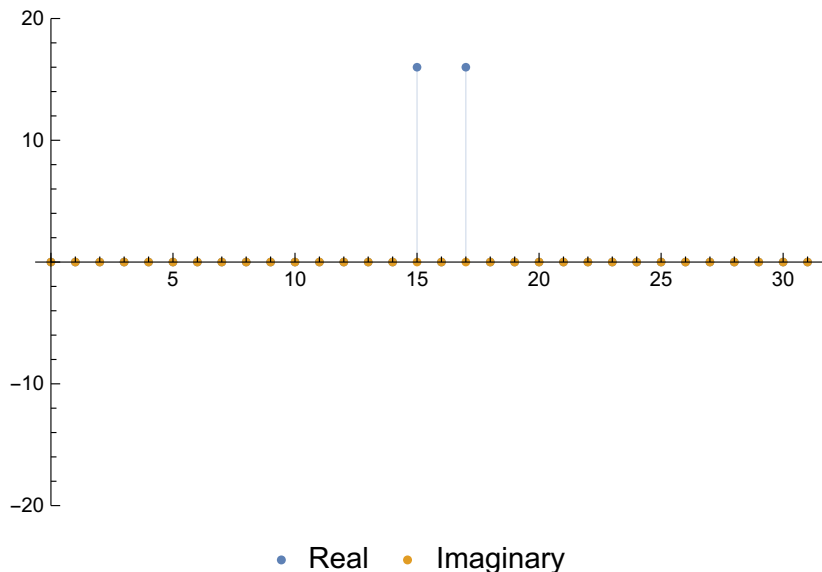
Fourierova transformace 32-bodového $\cos(3x)$



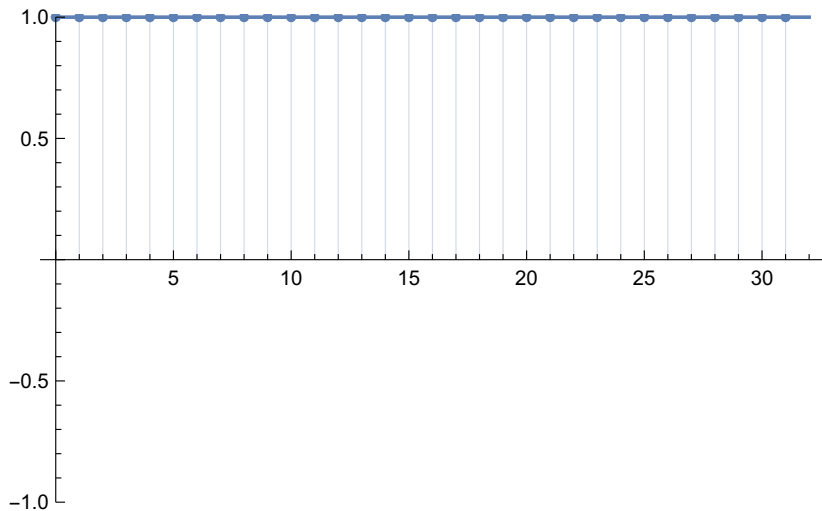
$\cos(15x)$ vzorkovaný v 32 bodech



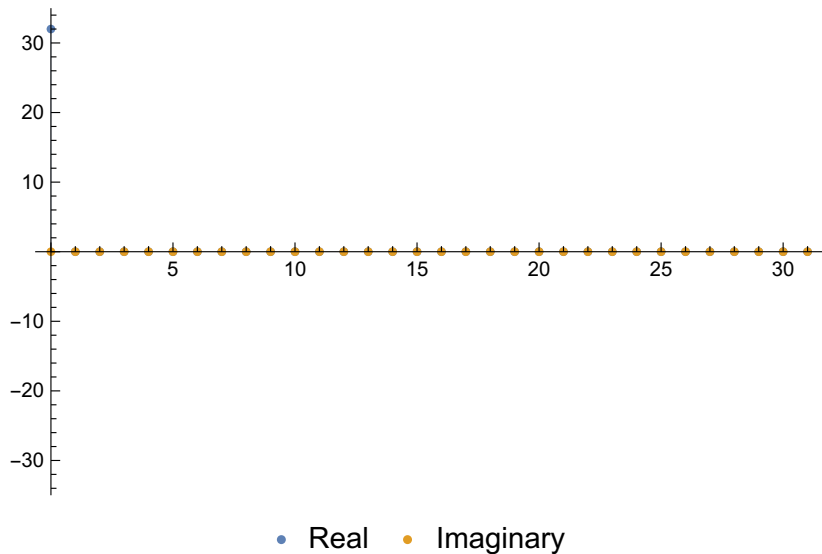
Fourierova transformace 32-bodového $\cos(15x)$



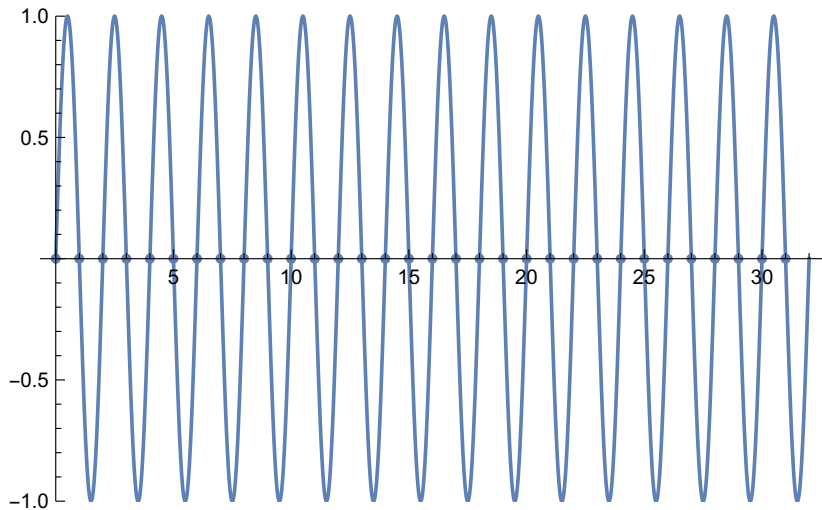
$\cos(0x)$ vzorkovaný v 32 bodech



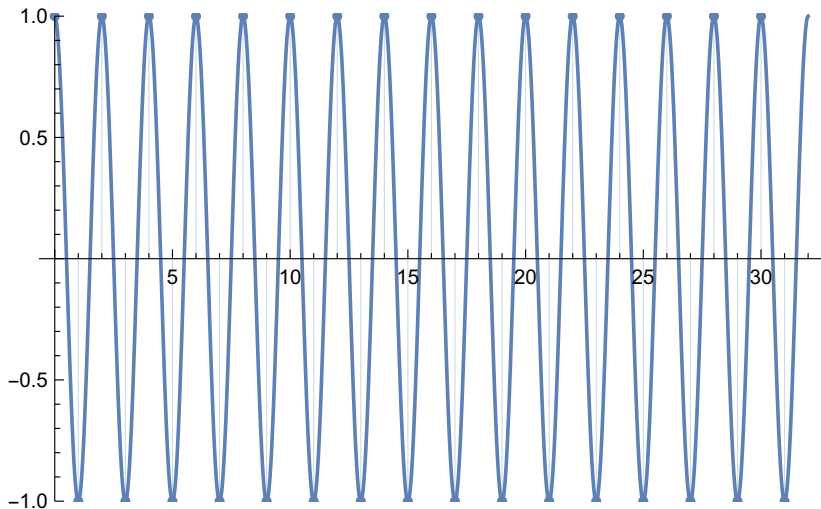
Fourierova transformace 32-bodového $\cos(0x)$



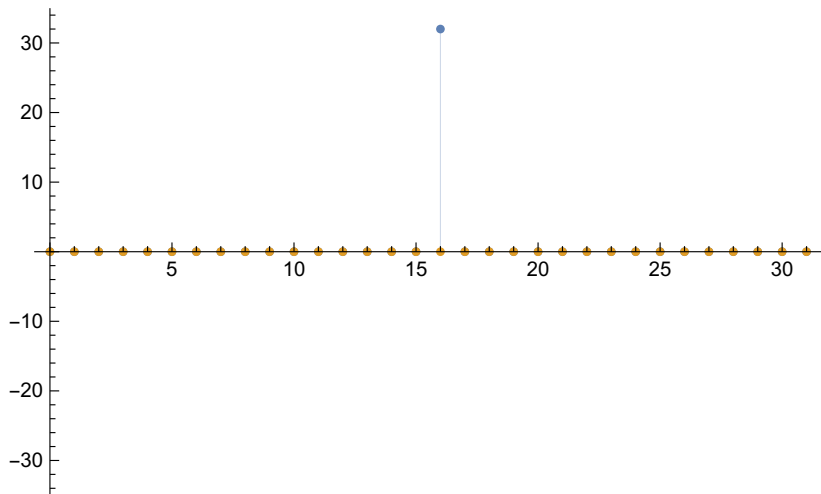
$\sin(16x)$ vzorkovaný v 32 bodech



$\cos(16x)$ vzorkovaný v 32 bodech



Fourierova transformace 32-bodového $\cos(16x)$



• Real • Imaginary

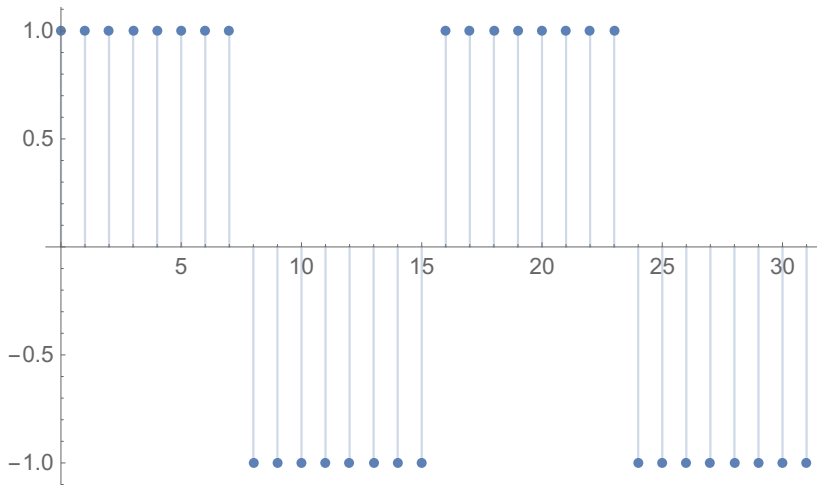
Věta

Nechť $\mathbf{x} \in \mathbb{R}^n$ a $\mathbf{y} = \mathcal{F}(\mathbf{x})$. Potom $\mathbf{y}_j = \overline{\mathbf{y}_{n-j}}$ pro všechna j .

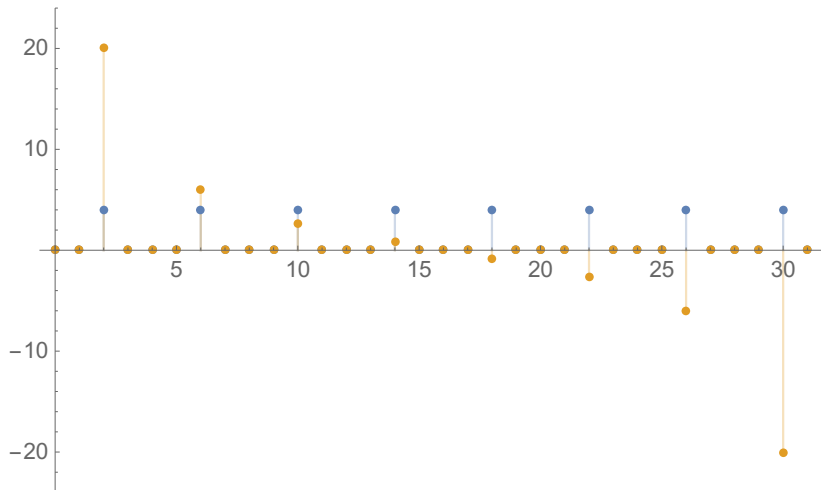
Tím pádem můžeme každý reálný vektor zapsat jako lineární kombinaci navzorkovaných sinů a kosinů:

- $\operatorname{Re}(\mathbf{x}_j)$ je koeficient u $\cos(jx)$ pro $j = 1, \dots, n/2$
- $\operatorname{Im}(\mathbf{x}_j)$ je koeficient u $\sin(jx)$ pro $j = 1, \dots, n/2 - 1$
- $\operatorname{Re}(\mathbf{x}_0)$ je aditivní konstanta ($\cos(0x)$)
- $\operatorname{Im}(\mathbf{x}_0)$ ve vždy 0
- $\operatorname{Im}(\mathbf{x}_{n/2})$ ve vždy 0

Filtrování: obdélníkový signál



Filtrování: DFT nám dává spektrum signálu



Filterování: signál bez vysokých frekvencí

