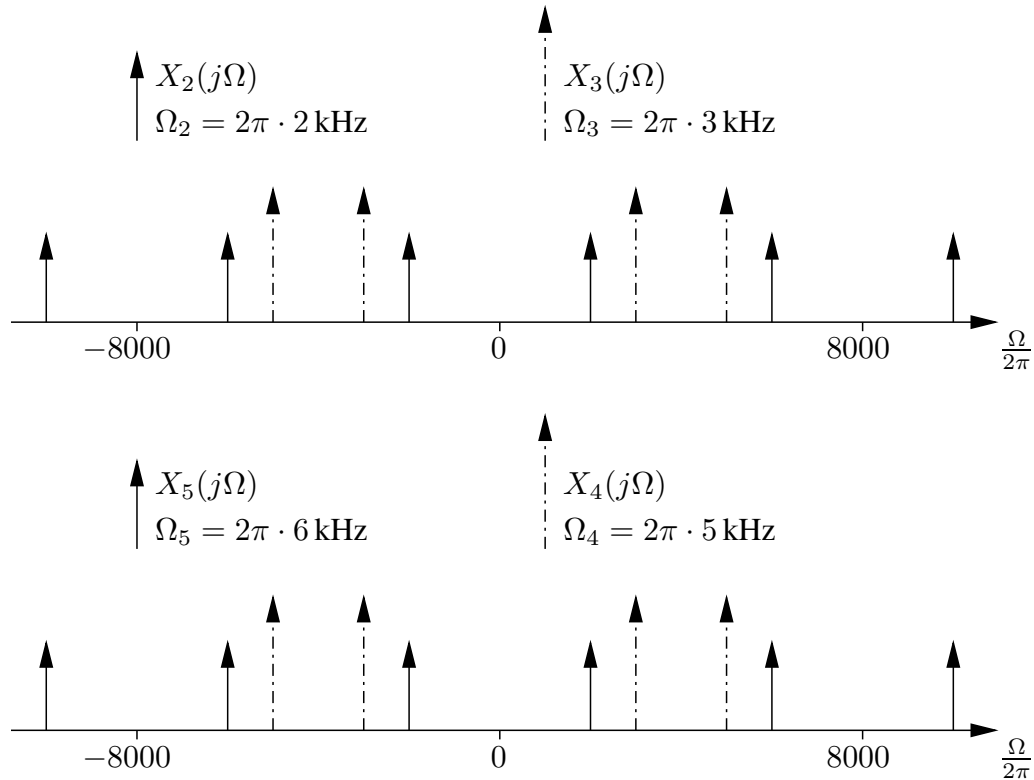


Audio Demonstration (aliasing)

- The function $x(t) = \sin(2\pi f_n t)$ is sampled with $\Omega_s = 2\pi \cdot 8000$ Hz to produce the sequence $x(n)$.



$$f_1 = 1000 \text{ Hz}, \quad f_2 = 2000 \text{ Hz}, \quad f_3 = 3000 \text{ Hz},$$

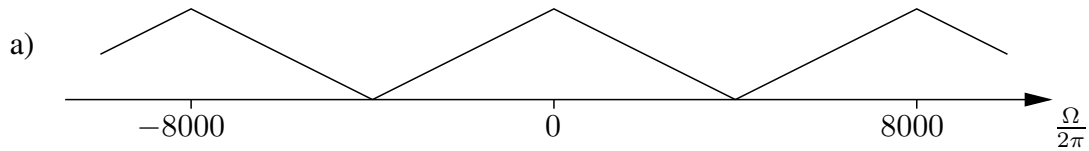
$$f_4 = 5000 \text{ Hz}, \quad f_5 = 6000 \text{ Hz}, \quad f_6 = 7000 \text{ Hz}$$

- Triangular sequence with fundamental frequencies 1.3 kHz, 2 kHz, and 6 kHz, respectively. For 2 kHz and 6 kHz no audible difference as all frequencies (fundamental frequency and harmonics) are copied/mirrored to 2 kHz!

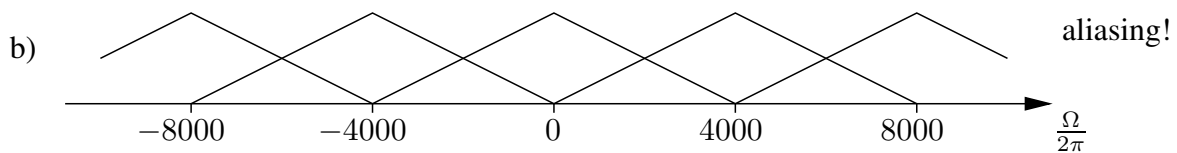
Audio Demonstration (aliasing)

- Speech:

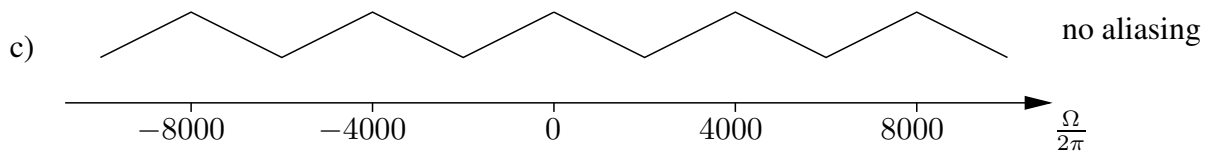
Speech, bandlimited to 4 kHz, sampling frequency 8 kHz



Speech, bandlimited to 4 kHz, sampling frequency 4 kHz



Speech, bandlimited to 2 kHz with lowpass, sampling frequency 4 kHz



- Music:

- Original with sampling frequency 44.1 kHz.
- Without lowpass prefiltering (aliasing!), sampling frequency 5.5 kHz.
- With lowpass prefiltering, sampling frequency 5.5 kHz.