Analysis of an AC signal

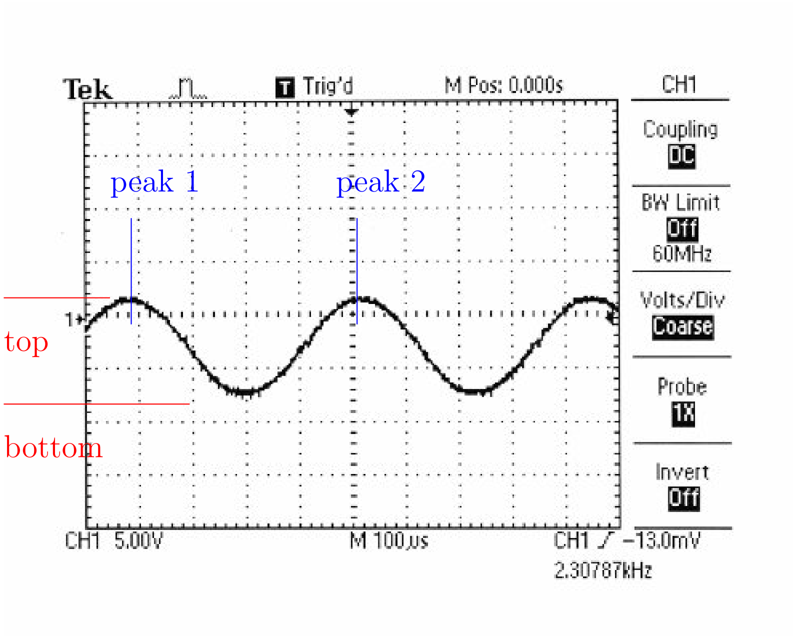

Figure 1: Sample

Calculations

Amplitude of the signal is given by

$$\begin{aligned} A &= \frac{V_{top} - V_{bottom}}{2} \\ &= \frac{(0.3 \pm 0.1)\, div - ((-1.6 \pm 0.1)\, div)}{2} \times 5V/div \\ &= \frac{(1.9 \pm 0.2)\, div}{2} \times 5V/div \\ &= (4.75 \pm 0.5)\, V \end{aligned}$$

DC offset of the signal is given by

$$\begin{aligned} D = V_{middle} &= \frac{V_{top} + V_{bottom}}{2} \\ &= \frac{(0.3 \pm 0.1)\, div + ((-1.6 \pm 0.1) div)}{2} \times 5V/div \\ &= \frac{(-1.3 \pm 0.2)\, div}{2} \times 5V/div \\ &= (-3.25 \pm 0.5)\, V \end{aligned}$$

Period of the signal is given by

$$
\begin{aligned}
T = T_{peak\ 2} - T_{peak\ 1} &= ((5.1 \pm 0.1)\, div - (0.8 \pm 0.1)\, div) \times 100 \mu S/div \\
&= (4.3 \pm 0.2 div) \times 100 \mu S/div \\
&= (430 \pm 20)\, \mu S
\end{aligned}
$$

Frequency of the signal is given by

$$f = \frac{1}{T} = \frac{1}{(430 \pm 20)\, \mu S} = (2.3 \pm 0.1)\, kHz$$

Explanations

The waveform is a sine wave, with the amplitude and DC offset calculated above. The calculated frequency of $2.3 \pm 0.1 kHz$ agrees with the value of $2.30787 kHz$ from the oscilloscope.