ECE 3 Lab 2 Lab Report

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100Hz Measurments

Waveform	Theoretical V_{RMS}	Scope Measurments V_{RMS}	Voltmeter Measurments V_{RMS}	Diffrence (%)
Sine	1.77V	1.7639V	1.7645V	0.034%
Triangle	1.44V	1.4325V	1.4378V	0.369%
Square	2.5V	2.4932V	2.4823V	-0.439%

1KHz Measurments

Waveform	Theoretical V_{RMS}	Scope Measurments V_{RMS}	Voltmeter Measurments V_{RMS}	Diffrence (%)
Sine	1.77V	1.7724V	1.7224V	-2.821%
Triangle	1.44V	1.4431V	1.3956V	-3.292%
Square	2.5V	2.4916V	2.3067V	-7.42%

25KHz Measurments

Waveform	Theoretical V_{RMS}	Scope Measurments V_{RMS}	Voltmeter Measurments V_{RMS}	Diffrence (%)
Sine	1.77V	1.7736V	0.029V	-98.319%
Triangle	1.44V	1.4408V	0.024V	-98.29%
Square	2.5V	2.4952V	0.041V	-98.34%

What's your observation regarding the voltmeter/DMM reading's accuracy over different frequencies within the same waveform? Can you guess why that's the case? The voltmeter became to perform worse at higher frequcies, because the capcitor setup int eh voltmeter and because the voltmeter sampling rate is set to 1s, both of these will act as a low pass filter, and mean that at higher frequcies, less of the actual wave is measured, thereforce causing the readings to become inacurate.

Does the voltmeter/DMM perform poorer when measuring square or triangular waves over sine waves? Can you guess why that's the case? The performance is worse with square wave, likely because it contains more higher frequices, which the voltmeter cannot measure well. As discussed above.

Square Wave Fourier Analysis

Nth Harmonic	Measured Values (dB)	Theoretical Values (dB)
1	0	0
2	-86.360	$-\infty$
3	-9.867	-9.542
4	-94.256	$-\infty$
5	-13.9304	-13.979
6	-83.295	$-\infty$
7	-19.1605	-16.90196
8	-84.5246	$-\infty$
9	-19.1293	-19.0848
10	-85.7619	$-\infty$