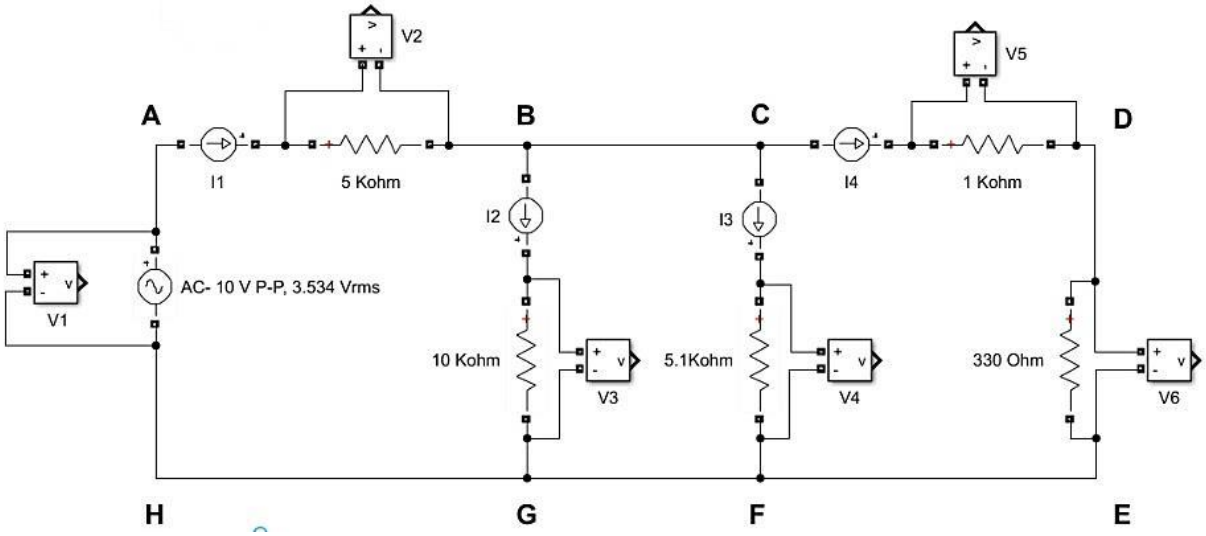
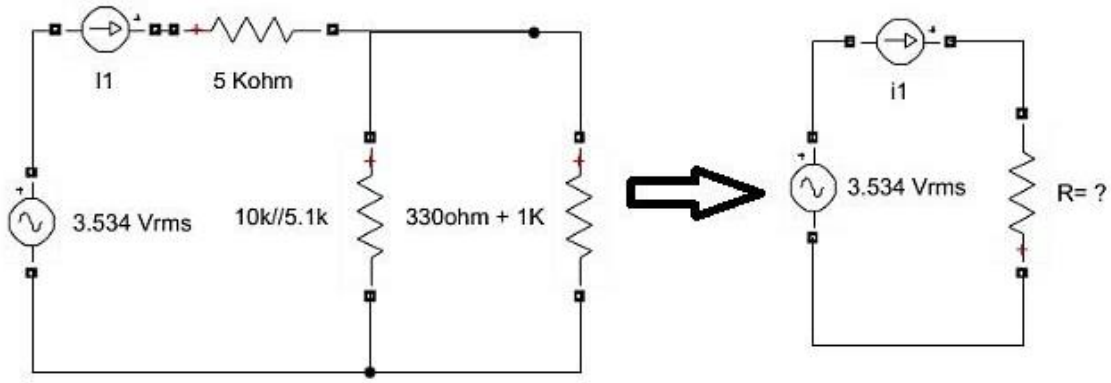
Prove KVL & KCL Laws



1. **Measure Voltage drops across all resistors & find i1, i2, i3, i4, currents & prove KVL+ KCL laws.**



2. **Initially calculate 'I1' current through Equivalent Circuit.**

3. **For KVL Law, V1= V2+V3, V1= V2+V4, V1= V1+V5+V6**

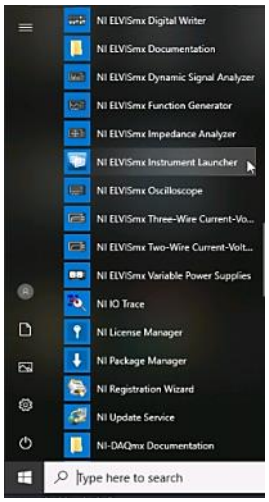
4. **For KCL Law, I1 = I2+I3+I4**

Where, I1 can be found from equivalent circuit or voltage drop across V2/R or through practical digital multi- meter of NIELVIS-mx Instrument Launcher. Similarly, find other I2, I3, I4 currents from its voltage drop dividing by its resistor.

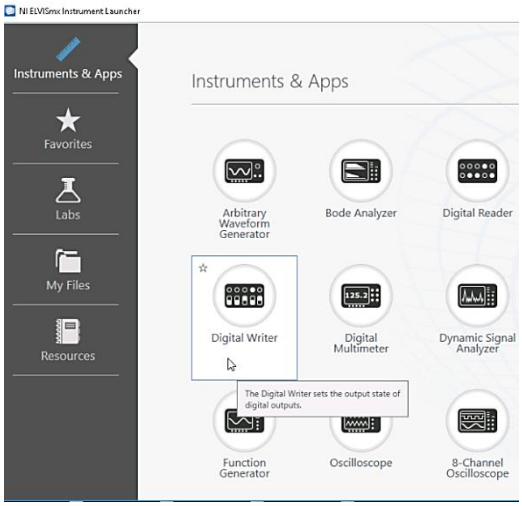
Prove KVL & KCL Laws

1. Open Electromeet and open "NI ELVISmx" as shown in figure.

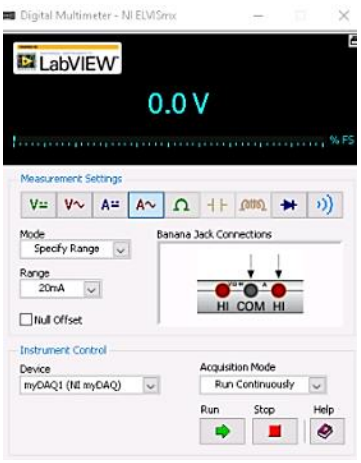
1. National Instrument



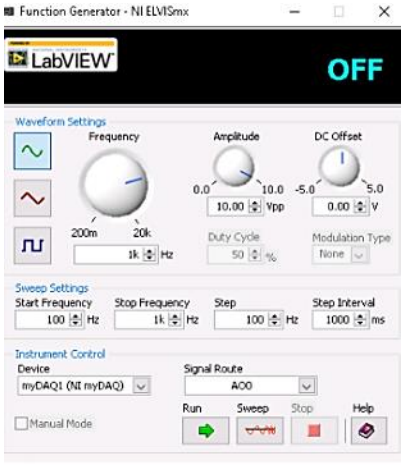
2. NI ELVISimx Instrument



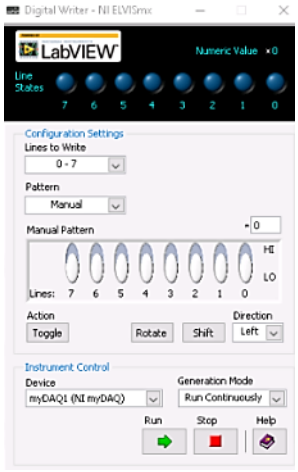
3. NI ELVISimx Instrument Launcher



4. Digital Multi-meter for Current I1



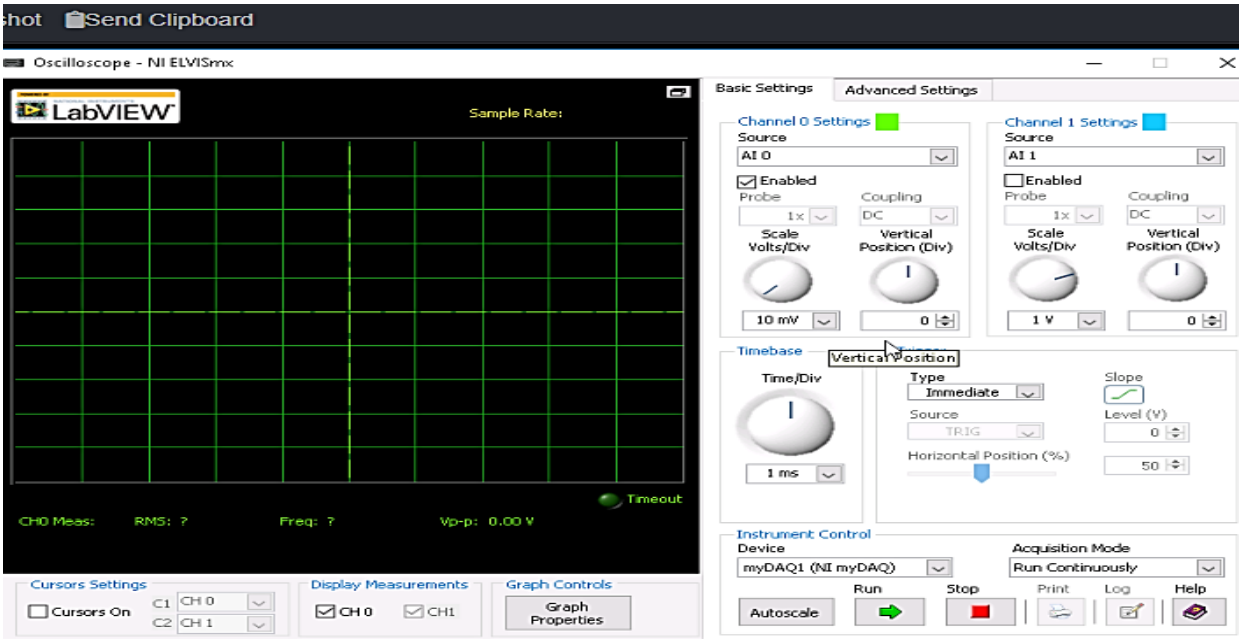
5. Function Generator



6. Digital Writer (v1 to v6)

Now you should able to play with all these real NI ELVISmx electronics applications and if there is confusion then ask with the concerned tutor. This is real practical so whatever you change the values it will directly affects the Oscilloscope signals so think before changing and try to find the voltage drop across each resistor and take the pictures of it to verify that you did it well.

Prove KVL & KCL Laws



7. Oscilloscope Signal where you can see the RMS Voltages of v1, v2, v3, v4, v5, v6.

Final Steps:

1. **Go NI-ELVISmx and open all the functions like Digital Writer, Digital Multi-Meter, Function Generator and Oscilloscope.**

2. **Open the Function Generator and create frequency 1 KHz with 10 voltage p-p Sinusoidal Signal as shown in above figure.**

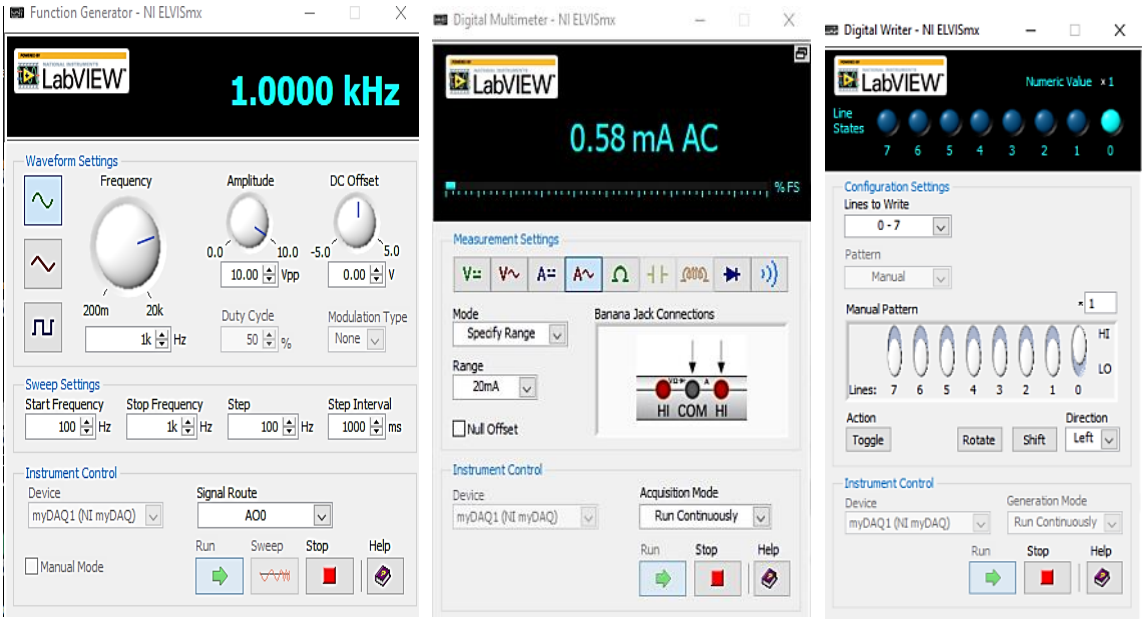
3. **Open the Digital Writer and to see the initial voltage drop signal on 'V1' put the value 0,0,0,1 where you can see the signal in Oscilloscope. Before 0,0,0,1 digital value you cannot see any voltage drop signal in oscilloscope. Similarly find the voltage drop in V2, V3, V4, V5 and V6.**

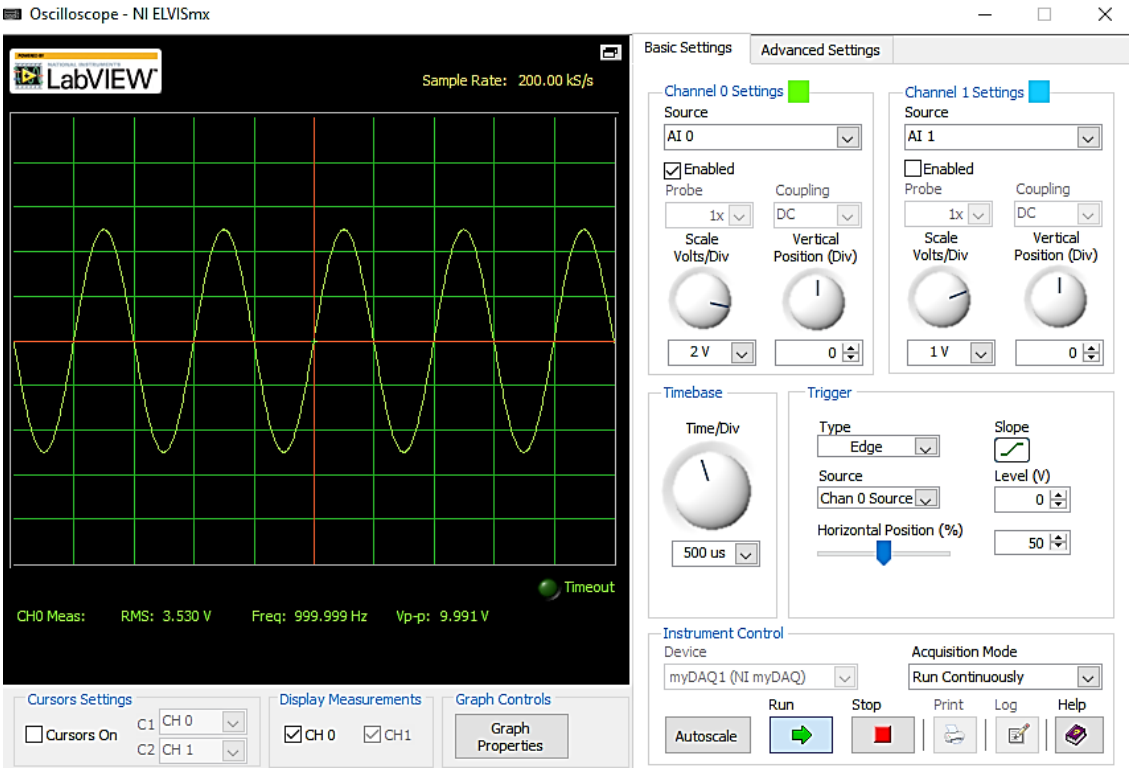
4. **Similarly, you can observe 'I1' current from digital meter which should be equal to sum of I2, I3, and I4 if you calculate properly.**

5. **At last vary the frequency from 1 KHz to 5 KHz or 10 KHz, similarly vary the input ac voltage and find the different currents and voltages to verify KVL & KCL Laws.**

Dig 3	Dig2	Dig1	Dig0	Output Voltage
0	0	0	1	V1
0	0	1	1	V2
0	1	0	1	V3
0	1	1	1	V4
1	0	0	1	V5
1	0	1	1	V6

Prove KVL & KCL Laws





Here, we have done for you one sample that means i1= 0.58 mA and voltage drop signal V1rms= 3.53v and rest i2, i3, i4 and V2, V3, V4, V5 and V6 you have to find where you should prove i1= i2+i3+i4 & V1=V2+V3, V1= V2+V4 and V1= V2+V5+V6. This will ultimately satisfy KVL and KCL laws.

Thanks