YEA ENGINEERING

Operational Amplifier Applications Lab

Introduction and Functional Overview

The Operational Amplifiers Applications Lab is based on the NI Analog Discovery Studio Max platform. The software is developed in the NI LabVIEW graphical programming environment. All hands-on experiments are conducted on the preassembled printed circuit board. The students can study the output signals of the circuits depending on the input stimulus. The course manual is embedded in lab software for easy access to ad-hoc theoretical materials during the lab. Experimental results of the lab may be exported and saved in MS Excel format (including student name, date, time, and studied circuit). Course software has a simple and intuitive user interface. The student uses the prototyping board for hands-on experiments with the electric circuits, as described in the operations manual. Circuit schematics and course instructions for each particular lab are presented on respective front panels and in the manual.

Features

- 18 exercises on Operational Amplifiers Applications
- Menu-driven navigation through the labs
- Student registration
- Step-by-step instructions for students
- Interactive study guide for each experiment
- Representation of experimental results on the screen (graphs, scope signals, numeric indicators)
- Export of results in MS Excel format

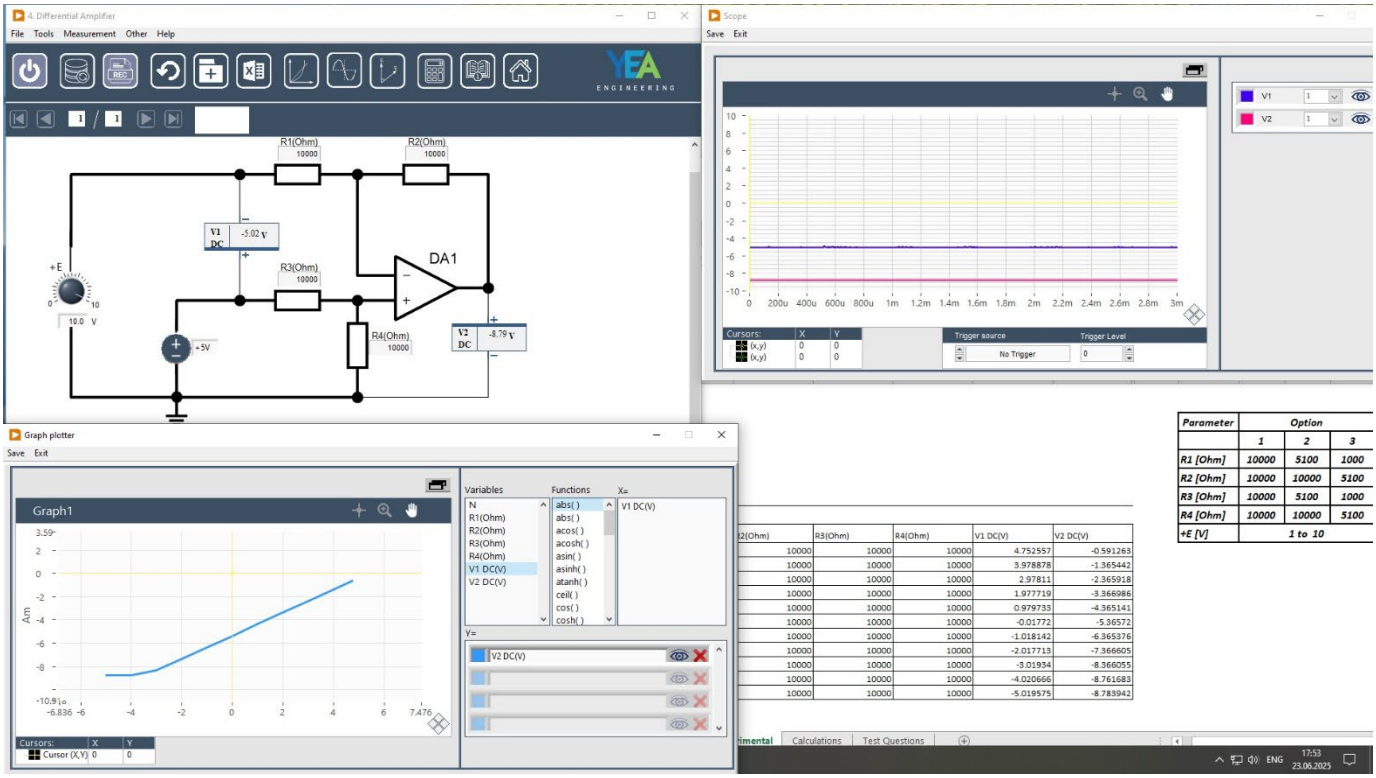
Hardware & Software

- NI ADSM platform
- «Operational Amplifiers Applications» board for NI ADSM
- Lab software
- User manual

List of Exercises

1. Inverting amplifier
2. Non-inverting amplifier
3. Voltage follower
4. Differential amplifier
5. Addition and subtraction of analog signals
6. Voltage-current converter
7. Integrator
8. Differentiator
9. Logarithmic amplifier
10. Exponential amplifier
11. Active rectifier
12. Comparator, Schmitt trigger
13. Amplitude limiter
14. Phase shifter
15. Analog sample-store circuit
16. Sine wave generator based on Wien bridge
17. Square- and triangle wave generator
18. Monostable multivibrator

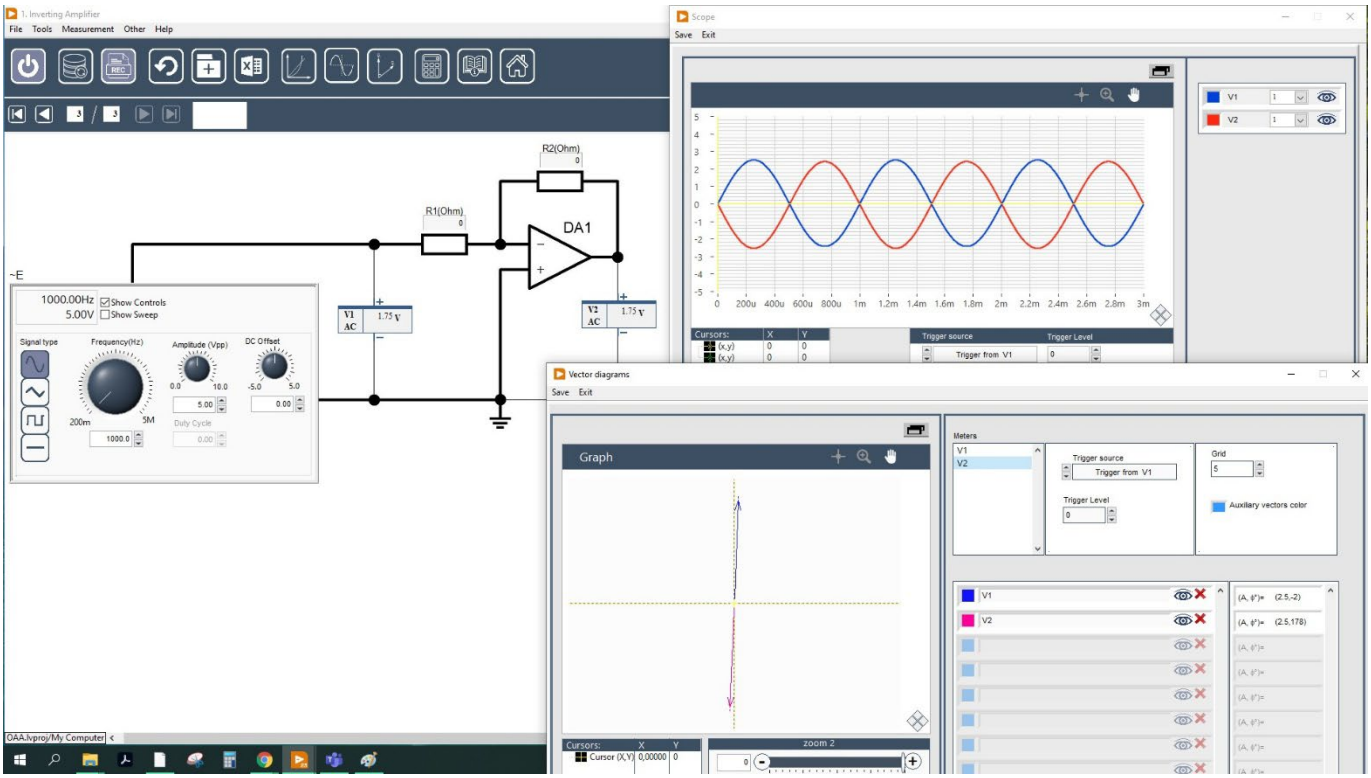
Examples of Exercise Demo



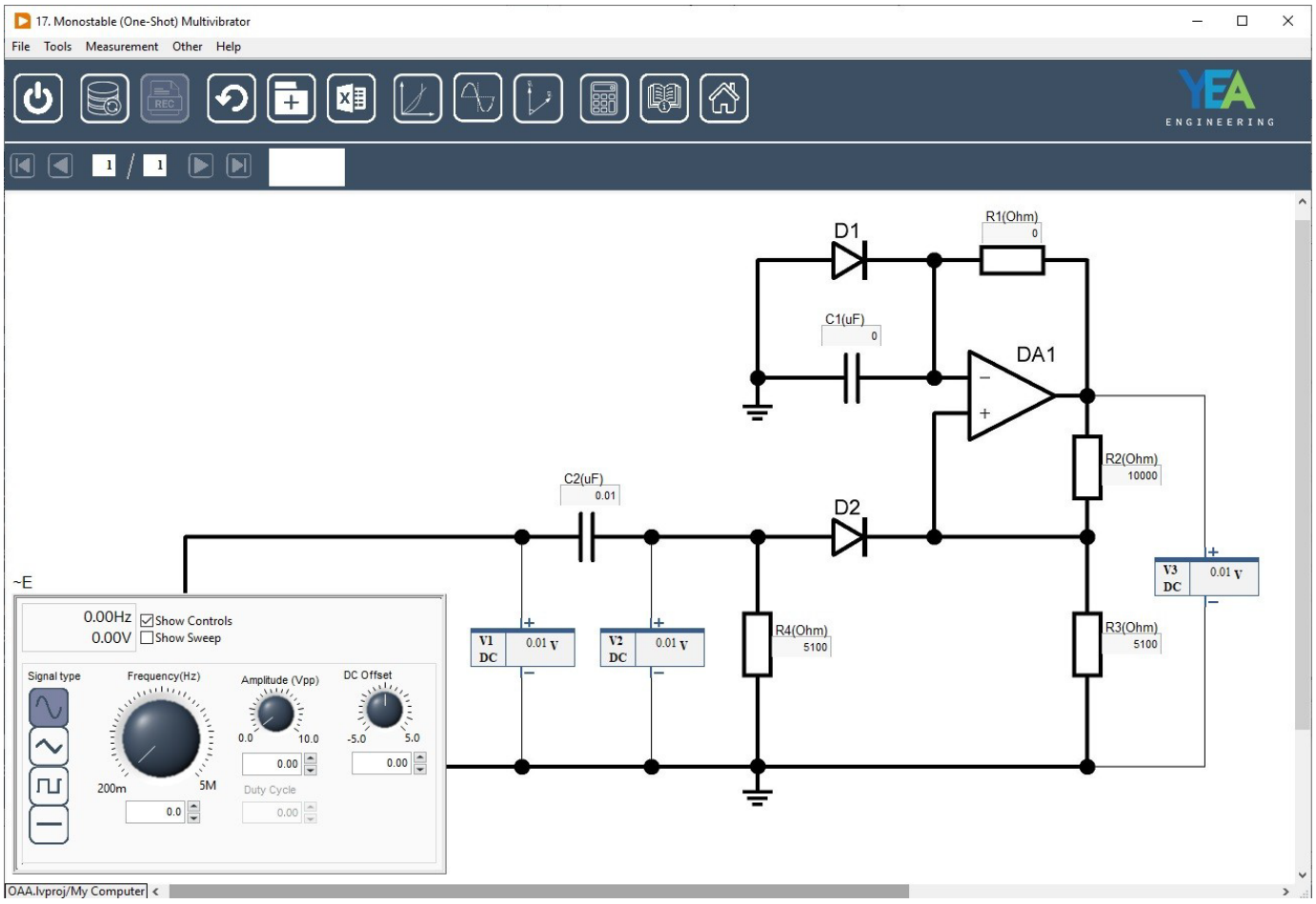
Parameter	Option		
	1	2	3
R1 [Ohm]	10000	5100	1000
R2 [Ohm]	10000	10000	5100
R3 [Ohm]	10000	5100	1000
R4 [Ohm]	10000	10000	5100
+E [V]	1 to 10		

R2(Ohm)	R3(Ohm)	R4(Ohm)	V1 DC(V)	V2 DC(V)
10000	10000	10000	4.752557	-0.591263
10000	10000	10000	3.978878	-1.365442
10000	10000	10000	2.97811	-2.365918
10000	10000	10000	1.977719	-3.366986
10000	10000	10000	0.979733	-4.365141
10000	10000	10000	-0.01772	-5.36572
10000	10000	10000	-1.018142	-6.365376
10000	10000	10000	-2.017713	-7.366605
10000	10000	10000	-3.01934	-8.366055
10000	10000	10000	-4.020666	-8.761683
10000	10000	10000	-5.019575	-8.783942

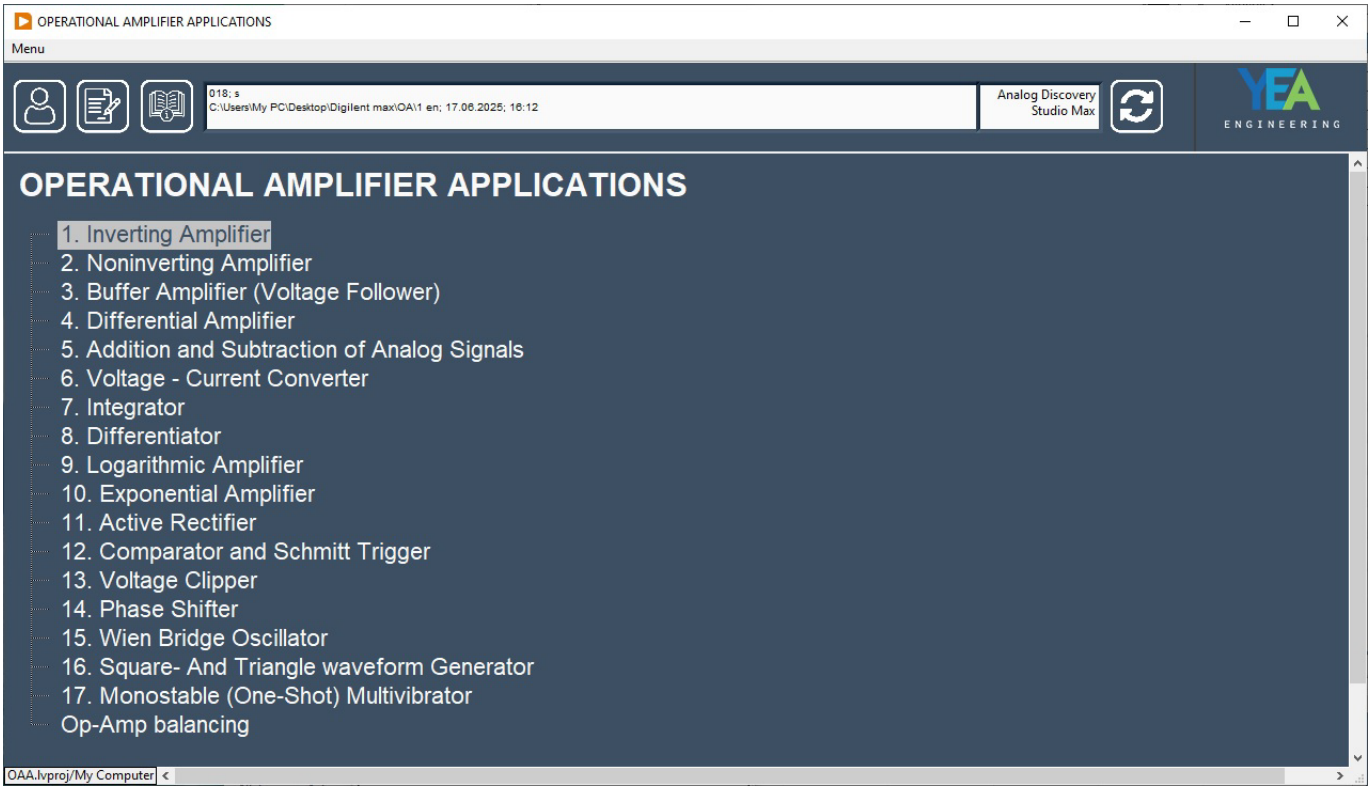
Differential Amplifier



Inverting Amplifier



Monostable Multivibrator



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