HDU-ITMO Joint Institute
杭州电子科技大学 圣光机联合学院

INFORMATION SENSORS
LAB WORK REPORT
For Lab Work №3
“Mechanical Sensors I”

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HDU-ITMO joint institute,
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I. The circuit

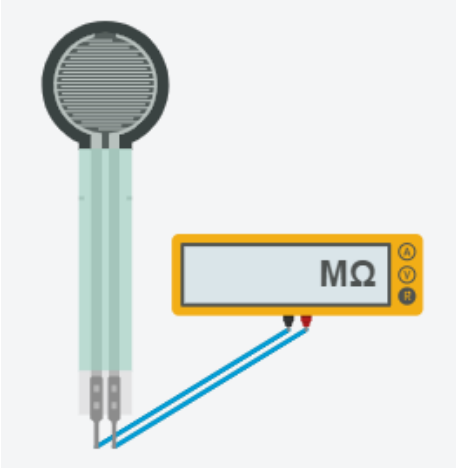


Figure 1. Circuit with strain gauge

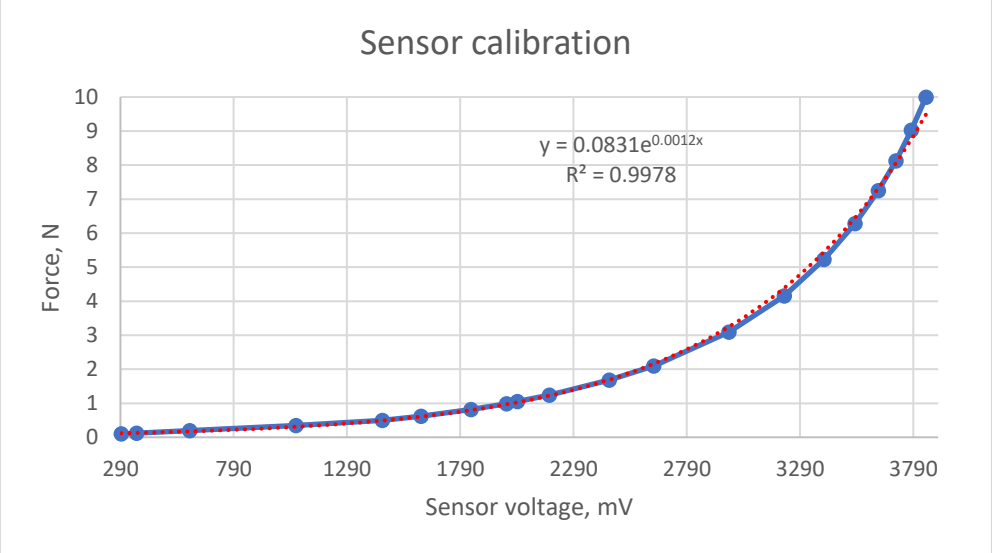
II. Table 1. Measurement of hysteresis of the strain gauge.

№1	Hystheresis study	
Load, N	Loading resistance, kOhm	Unloading resitance, kOhm
0.1	64.2	64.2
0.12	51.6	51.6
0.2	29.5	29.5
0.35	14.8	14.8
0.5	9.85	9.85
0.62	8.35	8.35
0.82	6.88	6.88
0.99	6.04	6.04
1.05	5.79	5.79
1.24	5.15	5.15
1.68	4.17	4.17
2.1	3.56	3.56
3.09	2.72	2.72
4.16	2.21	2.21
5.23	1.88	1.88
6.28	1.66	1.66
7.25	1.5	1.5
8.12	1.39	1.39
9.03	1.29	1.29

III. Table 2. Measurement of voltage output of the sensor circuit

№2	Output voltage
Load, N	Vout, mV
0.1	293
0.12	361
0.2	596
0.35	1065
0.5	1446
0.62	1617
0.82	1837
0.99	1994
1.05	2043
1.24	2184
1.68	2448
2.1	2644
3.09	2976
4.16	3220
5.23	3396
6.28	3533
7.25	3636
8.12	3714
9.03	3782
10	3846

IV. Plot with an interpolation curve:



V. Circuit's transfer function formula:

$$y=0.0831\ e^{0.0012\ x}$$

VI. Table 3.

№3	Calibration	
Load, N	Measured load, N	Error, %
0.1	0.118113344	-18.11%
0.5	0.471182127	5.76%
0.62	0.578503561	6.69%
1.24	1.142352146	7.87%
2.1	1.983949238	5.53%
3.09	2.954972731	4.37%
4.16	3.960179779	4.80%
6.28	5.765485832	8.19%
9.03	7.773258322	13.92%
10	8.393767137	16.06%

VII. Link to a TinkerCAD project:

https://www.tinkercad.com/things/2ueQDBQqsc2-lab-work-3?sharecode=iOEAgYgDmFi0Q0Gd47vA9A2SDUQDXgyR675QdEW66_s