Biomedical Engineering Dept.
Lab of biosensors
.Semester 2

Report Title "Strain gauge"

By

Hasssan tahseen/حسن تحسين

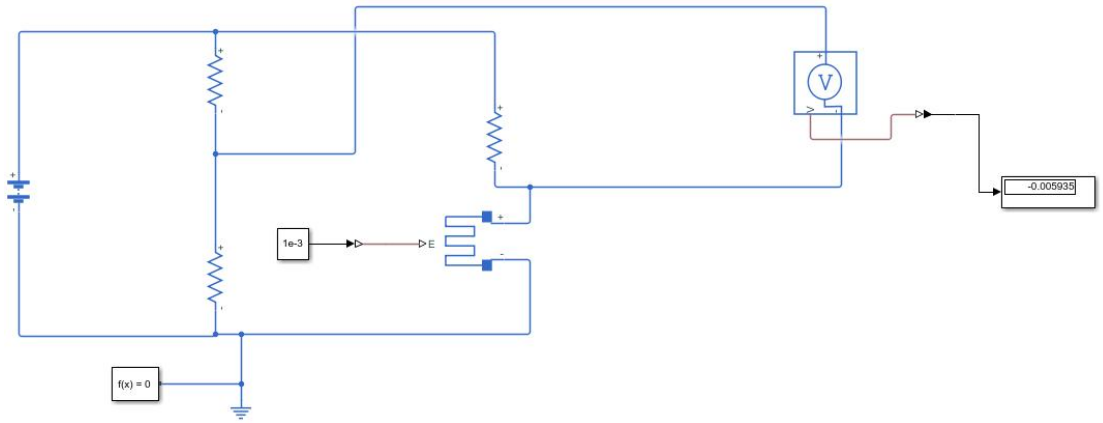
Group -1-Morning

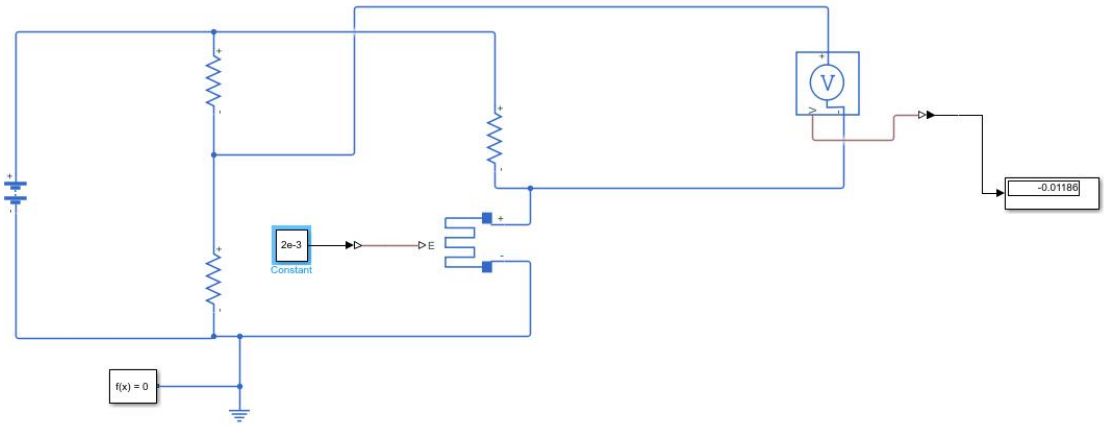
Supervised By

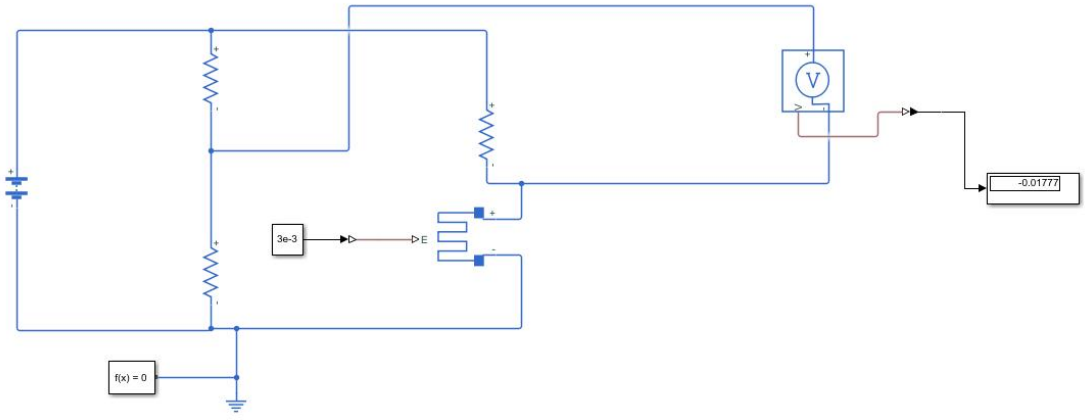
Asst. Lect. Atheer jamhour

2021 **1443**

practical side:







Constant	V_o
$1x10^{-3}$	-0.005935
$2x10^{-3}$	-0.01186
$3x10^{-3}$	-0.01777

Theoretical side:

When constant = $1x10^{-3}$

$\Delta R = Gf \times \varepsilon \times R = 2 \times 0.001 \times 200 = 0.4$

$R_4^- = R_4 + \Delta R \times R_4^- = 200 + 0.4 \times 200 = 280$

$V_0 = (R_3 / R_1 + R_3 - R_4 / R_2 + R_4) \times E$

$= (200 / 200 + 200 - 280/200+280) \times 12 = -1$

When constant = $2x10^{-3}$

$\Delta R = Gf \times \varepsilon \times R = 2 \times 0.002 \times 200 = 0.8$

$R_4^- = R_4 + \Delta R \times R_4^- = 200 + 0.8 \times 200 = 360$

$V_0 = (R_3 / R_1 + R_3 - R_4 / R_2 + R_4) \times E$

$= (200 / 200 + 200 - 360/200+360) \times 12 = -1.714$

When constant = $3x10^{-3}$

$\Delta R = Gf \times \varepsilon \times R = 2 \times 0.003 \times 200 = 1.2$

$R_4^- = R_4 + \Delta R \times R_4^- = 200 + 1.2 \times 200 = 440$

$V_0 = (R_3 / R_1 + R_3 - R_4 / R_2 + R_4) \times E$

$= (200 / 200 + 200 - 440/200+440) \times 12 = -2.25$

Medical and Healthcare Strain Gage Applications

There are numerous strain gages applications in the medical and healthcare industry. For example:

They are often used in medical instruments like kidney dialysis machines and syringe pumps to help monitor fluid flow rates.

Strain gauges are also used in patient weighing and patient lift systems.

Wireless strain gauges can be found in CT scanners and mammography machines.

Patient positioning systems used during radiation treatments

In physical therapy applications, strain gage based force sensors are used to measure forces on joints (shoulders, hips, knees, et al).

Force feedback crutches aid patients undergoing orthopedic therapy by detecting the amount of weight is being borne by the crutch