- **Last Class**

- **Electrodes** → $V_{ions} \rightarrow V_{e^-}$

  - $V_p = V_f + V_C + V_o$

  - $V_f = \frac{1}{2} \text{cell (comes from AgCl)}$

  - $V_C = iR$

  - $V_o$ is stable

- **Polarizable (C)**

  - SS or Pt

  - SS = Stainless steel

  - Body

  - $\frac{1}{R_{body}}$

    - $\left( \frac{1}{R_{body}} \right)^{-1}$

  - $R_{elect}$

  - $R_{body}$

- **Non-polarizable (R1/C)**

  - AgCl/Ag

  - I$_{DC}$ flows b/c AgCl reacts Cl$^-$ in body.

- **Movement Artefact**

  - $V_C$ moves

  - $V_C$ changes
Q. (07B.6)

Tests

1. CW → $V_o = 0 V$, $0^\circ$
2. CCW → $V_o = 10 V$, $360^\circ$

Sensitivity = $\frac{10 V}{360^\circ} = \frac{1}{36} \frac{V}{\text{deg}}$

Resolution:

- Smallest change (measure at input)
  - 1 turn = $\frac{360^\circ}{50} \Leftarrow \text{wire turns}$

- Smallest change (at output)
  - $\left(\frac{360^\circ}{50}\right) \left(\frac{1 V}{36^\circ}\right) = 0.2 V$

Strain Gauge

More sensitive

Less sensitive

Poisson’s Ratio: Compressibility of materials

- Water (0.5) → Incompressible
- Metal (0.3) → Compressible

Piezoelectric Sensor

Vibration sensors (stress → voltage)

Voltage → stress

UltraSound application

Micro actuators (cell motion)
Mistake on O7B.25 → It should be negative FB

OpAmp Config for the THERMISTER example.