For more materials visit www.educationobserver.com/foru

Measurement and Instrumentation

- In PMMC, Final steady deflection $\theta = \left(\frac{G}{K}\right) I$
- Value of shunt in Voltmeter $R_s = \frac{I_m R_m}{I_s}$
- Sensitivity of Voltmeter: $\boxed{S_v = \frac{1}{I_{fs}}}$ unit Ω/v
- PMMC are used for measurement of DC only.
- Torque produced in moving iron instruments

$$\tau_d = \frac{I^2}{2}\frac{dL}{d\theta}$$

- Deflection in MI instrument

$$\boxed{\theta = \frac{I^2}{2k}\frac{dL}{d\theta}}$$

- For electrostatic meter, deflection

$$\boxed{x = \frac{V^2}{2K}\frac{dC}{dx}}$$

- Balance condition of AC bridge $Z_1 Z_4 = Z_2 Z_3$

and $\angle\theta_1 + \angle\theta_4 = \angle\theta_2 + \angle\theta_3$

- For Maxwell's Inductance Bridge,

$$Lx = \frac{R_3}{R_4} L_2 \ , Rx = \frac{R_3}{R_4}(R_2 + r_2)$$

- Maxwell Inductance – Capacitance Bridge $R_1 = \frac{R_2 R_3}{R_4}$, $L_1 = R_2 R_3 C_4$
- Hay's bridge $L_1 = \frac{R_2 R_3 C_4}{1 + \omega^2 C_4^2 R_4^2}$

$$R_1 = \frac{\omega^2 R_2 R_3 R_4 C_4^2}{1 + \omega^2 C_4^2 R_4^2}$$

- Anderson's bridge $R_1 = \frac{R_2 R_3}{R_4} - r_1$,

$$L_1 = C\frac{R_3}{R_4}[r(R_4 + R_2) + R_2 R_4]$$

- Owen's bridge $L_1 = R_2 R_3 C_4$, $R_1 = R_3 \frac{C_4}{C_2}$

- De Sauty's Bridge $C_1 = \dfrac{C_2 \cdot R_4}{R_3}$
- Shearing Bridge $\boxed{r_1 = \dfrac{c_4}{c_2} R_3}$, $\boxed{C_1 = \dfrac{R_4}{R_3} \cdot c_2}$
- Wein bridge frequency $\boxed{f = \dfrac{1}{2\pi\sqrt{C_1 C_2 R_1 R_2}}}$