ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

UNIT 3

Measurement of Parameters

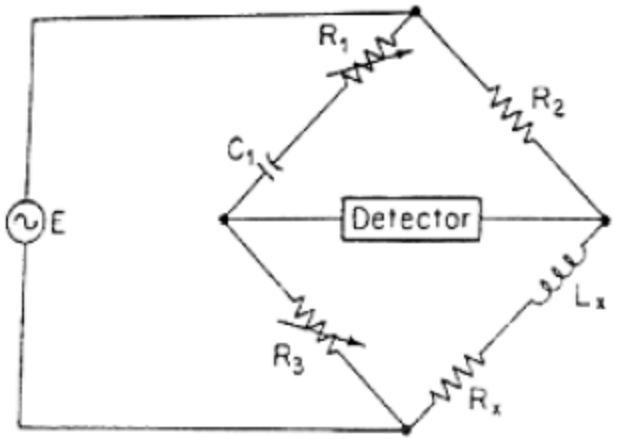
Hay Bridge

- The Hay circuit is more convenient for measuring high-*Q coils*
- Hay bridge for inductance measurements
- $L_x = \dfrac{R_2 R_3 C_1}{1+\omega^2 R_1^2 C_1^2}$ *Lx= R2R3C.*

$$R_x = \frac{\omega^2 C_1^2 R_1 R_2 R_3}{1+\omega^2 R_1^2 C_1^2}$$

Where, Q is the quality factor.

$$L_x = \frac{R_2 R_3 C_1}{1+(1/Q)^2}$$

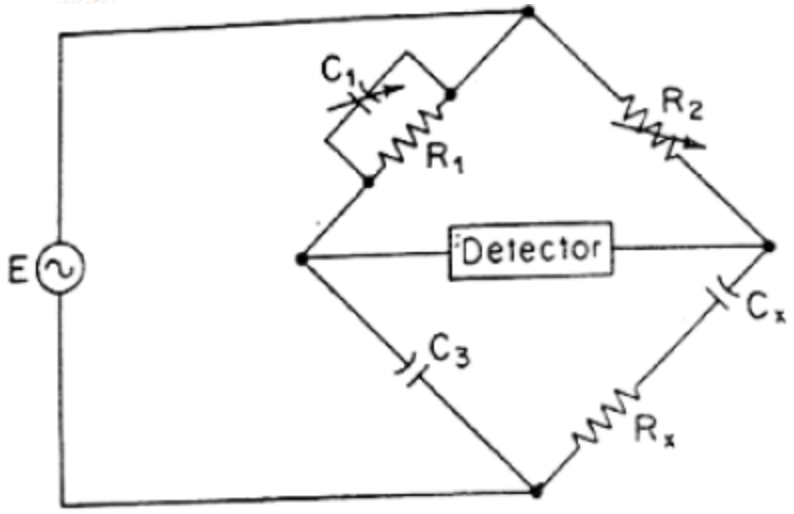


Schering Bridge

- The Schering Bridge, one of the most important bridges, is used extensively for the measurement of capacitors.
- Schering bridge for measurement of capacitance

$R_x = R_2 \frac{C_1}{C_3}$ Dissipation factor :

$C_x = C_3 \frac{R_1}{R_2}$ $D = \omega R_1 C_1$



Wien Bridge

- Series RC combination in one and a parallel combination in the adjoining arm
- Its basic form is designed to measure f frequency
- used for instrument of an unknown capacitor with great accuracy

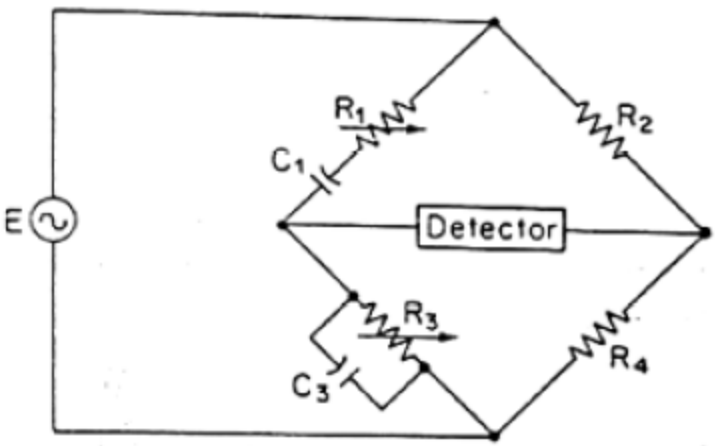
$$\frac{1}{\omega C_1 R_3} = \omega C_3 R_1$$

$$\omega^2 = \frac{1}{C_1 R_1 R_3 C_3}$$

$$\omega = \frac{1}{\sqrt{C_1 R_1 C_3 R_3}}$$

$$\omega = 2\pi f$$

$$f = \frac{1}{2\pi\sqrt{C_1 R_1 C_3 R_3}}$$



Anderson Bridge

- The unknown inductance is measured in terms of a known capacitance and resistance.
- Method is capable of precise measurements of inductance over a wide range of values from a few micro-henrys to several henrys and is the best bridge method

By solving the balance equatior

$$L = C\left[(R_1 + R_2)R_3 + R_3R_4\right]$$