## De Sauty's Bridge

This method is the simplest way of comparing two capacitances. In this bridges two capacitors whose capacitances are to be compared or one unknown and other known capacitances are connected as shown in figure. Audio frequency oscillator and headphone are connected in the gaps AC and BD respectively.

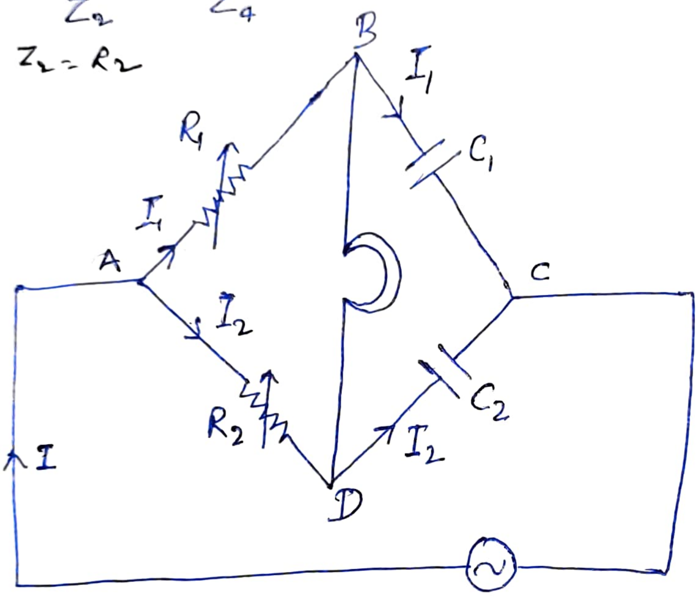
If the power factors of the capacitors are neglected then at balance, we have

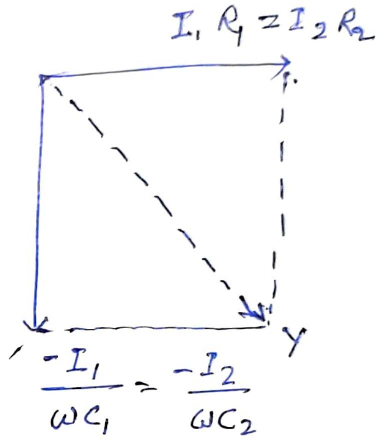
$$\frac{Z_1}{Z_2} = \frac{Z_3}{Z_4}$$ where $Z_1, Z_2, Z_3$ and $Z_4$ are the impedance of different arms.

and $Z_1 = R_1$; $Z_2 = R_2$

$Z_3 = \frac{1}{j\omega C_1}$

$Z_4 = \frac{1}{j\omega C_2}$




$$\therefore \quad \frac{R_1}{R_2} = \frac{1/j\omega C_1}{1/j\omega C_2}$$

Thus, $$\frac{R_1}{R_2} = \frac{C_2}{C_1} \quad \text{or} \quad C_1 = \frac{C_2 R_2}{R_1} \qquad \text{——— (1)}$$

A comparison of capacitances is therefore made in terms of variable, non inductive resistances $R_1$ and $R_2$. The balance is also independent of frequency. For maximum sensitivity $C_2$ should be equal to $C_1$. The perfect balance can be obtained only in case of air Capacitor. In practice, the Comparision of ordinary Condenser is not so simple, as the Capacitors are not both free from dielectric Losses. As the behaviour of a Condenser with an imperfect dielectric depends on the frequency, it is important that the Correct periodicity be employed. Impect Capacitor may be regarded as made up of a Capacitance associated with a resistance, either a Small resistance in Series or a large resistance in parallel. To obtain an accurate balance, it is necessary to balance out the associated resistance.

There may be some residual sound in the head phones at the balance point due to a residual potential drop Caused by the unbalanced power factor's of the Capacitor.