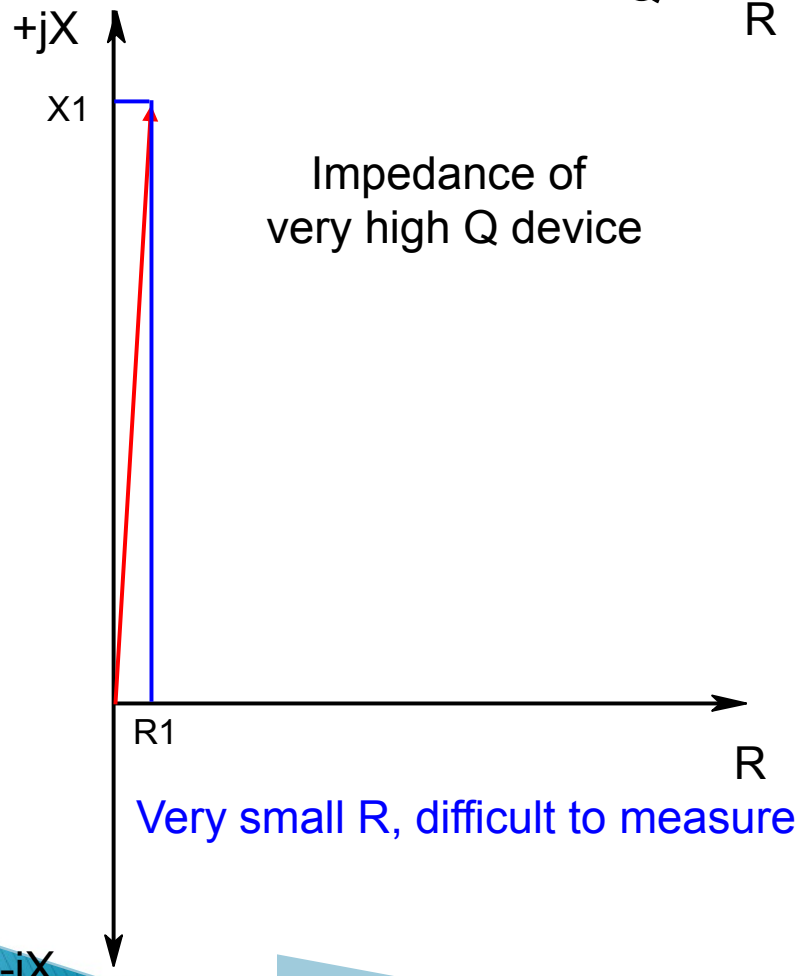
Q METERS

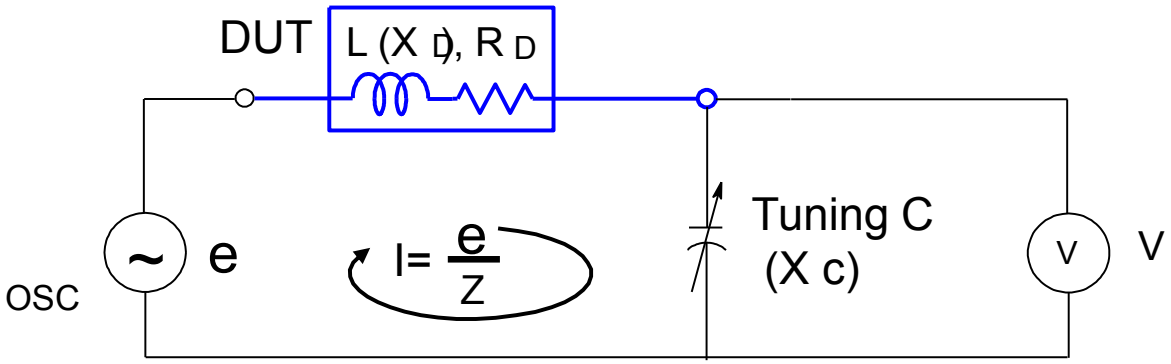
$$Q = \frac{X_L}{R}$$



Resonance (Q - Meter) Technique

Theory of Operation

- Tune C so the circuit resonates
- At resonance $X_D = -X_C$, only R_D remains



$$X_C = \frac{V}{I} = \frac{R_D V}{e} \quad \text{(at resonance)}$$

$$Q = \frac{|X_D|}{R_D} = \frac{|X_C|}{R_D} = \frac{|V|}{e}$$

Resonant Method

Advantages and Disadvantages

Very good for high Q - low D measurements

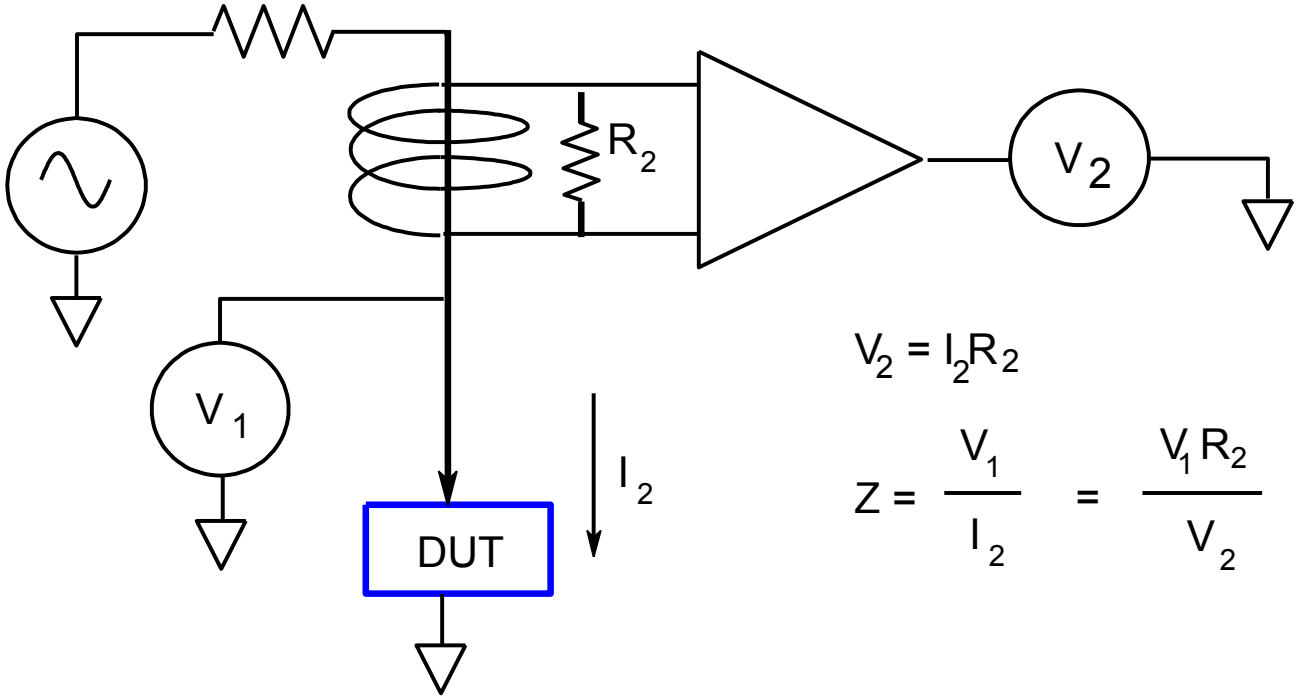
Requires reference coil for capacitors

Limited L,C values accuracy

Vector		Scalar
75kHz - 30MHz	■	22kHz - 70MHz
automatic and fast	■	manual and slow
easy to use	■	requires experienced user
limited compensation	■	No compensation

I - V Probe Technique

Theory of Operation



$$V_2 = I_2 R_2$$

$$Z = \frac{V_1}{I_2} = \frac{V_1 R_2}{V_2}$$

I-V (Probe)

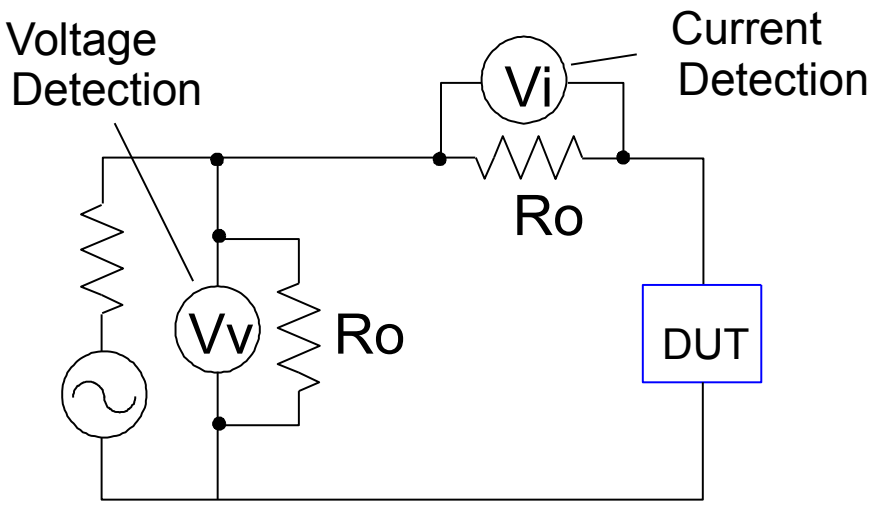
Advantages and Disadvantages

- Medium frequency, 10kHz < f < 110MHz
- Moderate accuracy and measurement range
- Grounded and in-circuit measurements
- Simple-to-use

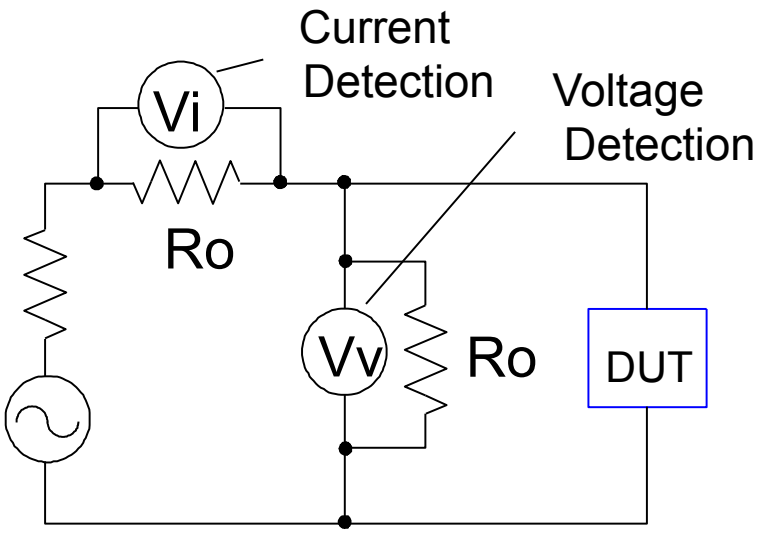
RF Power Measurement

Theory of Operation

High Impedance Test Head



Low Impedance Test Head



RF I-V

Advantages and Disadvantages

- High frequency, 1MHz < f < 1.8GHz
- Most accurate method at > 100 MHz
- Grounded device measurement

VIRTUAL LAB LINK

- http://iitkgp.vlab.co.in/?sub=39&brch=124&sim=1646&cnt=1
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