RAMA UNIVERSITY

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FACULTY OF ENGINEERING & TECHNOLOGY

Electrical Machine-1

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Transformer Voltage Regulation

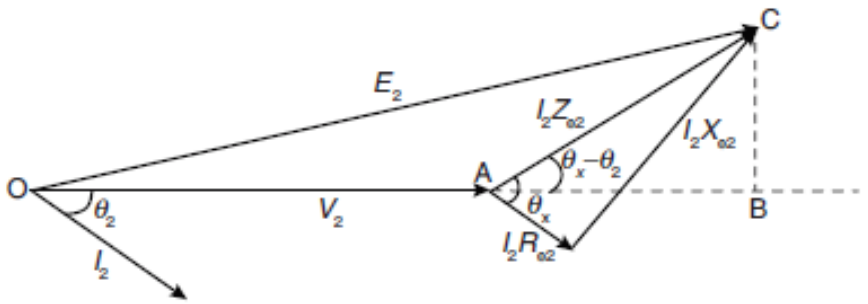
Because a real transformer has series impedance within it, the output voltage of a transformer varies with the load even if the input voltage remains constant. The voltage regulation of a transformer is the change in the magnitude of the secondary terminal voltage from no-load to full-load.

$$\%Voltage\ Regulation = \frac{V_s[no-load] - V_s[full-load]}{V_s[full-load]} \times 100$$

$$\approx \frac{V_p[no-load] - V_p[full-load]}{V_p[full-load]} \times 100$$

Referred to the primary side

Voltage Regulation

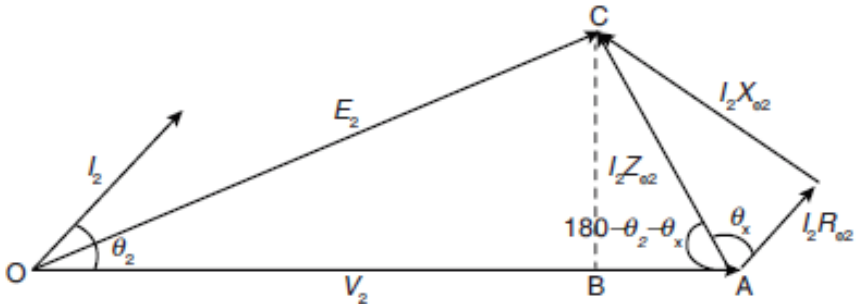


Lagging Load

$$\text{Voltage regulation} = \frac{I_2 R_{e2} \cos\theta_2 \mp I_2 X_{e2} \sin\theta_2}{V_2} \times 100$$

Where,

– ve sign is for leading power factor and +ve sign is for lagging power factor load.



Leading Load

Determining the Values of Components in the Transformer Model

It is possible to experimentally determine the parameters of the approximate the equivalent circuit. An adequate approximation of these values can be obtained with only two tests….

- *open-circuit test*
- *short-circuit test*

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