SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

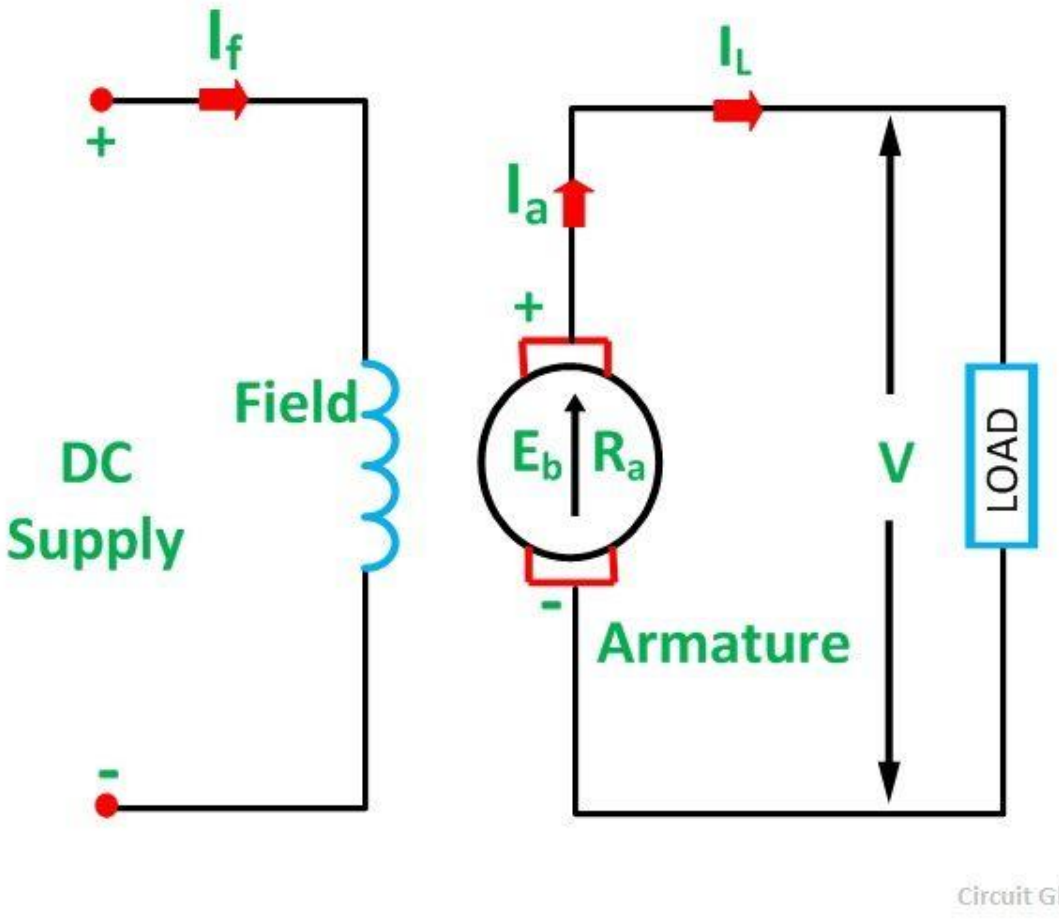
COURSE NAME : 23EET01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR /II SEMESTER ARTIFICIAL INTELLIGENCE & DATA SCIENCE

Unit 2 – ELECTRICAL MACHINES

Voltage Equation & Characteristics of DC Generator

GENERAL REPRESENTATION OF DC GENERATOR



Field Winding – Electromagnet

I_f- Field current

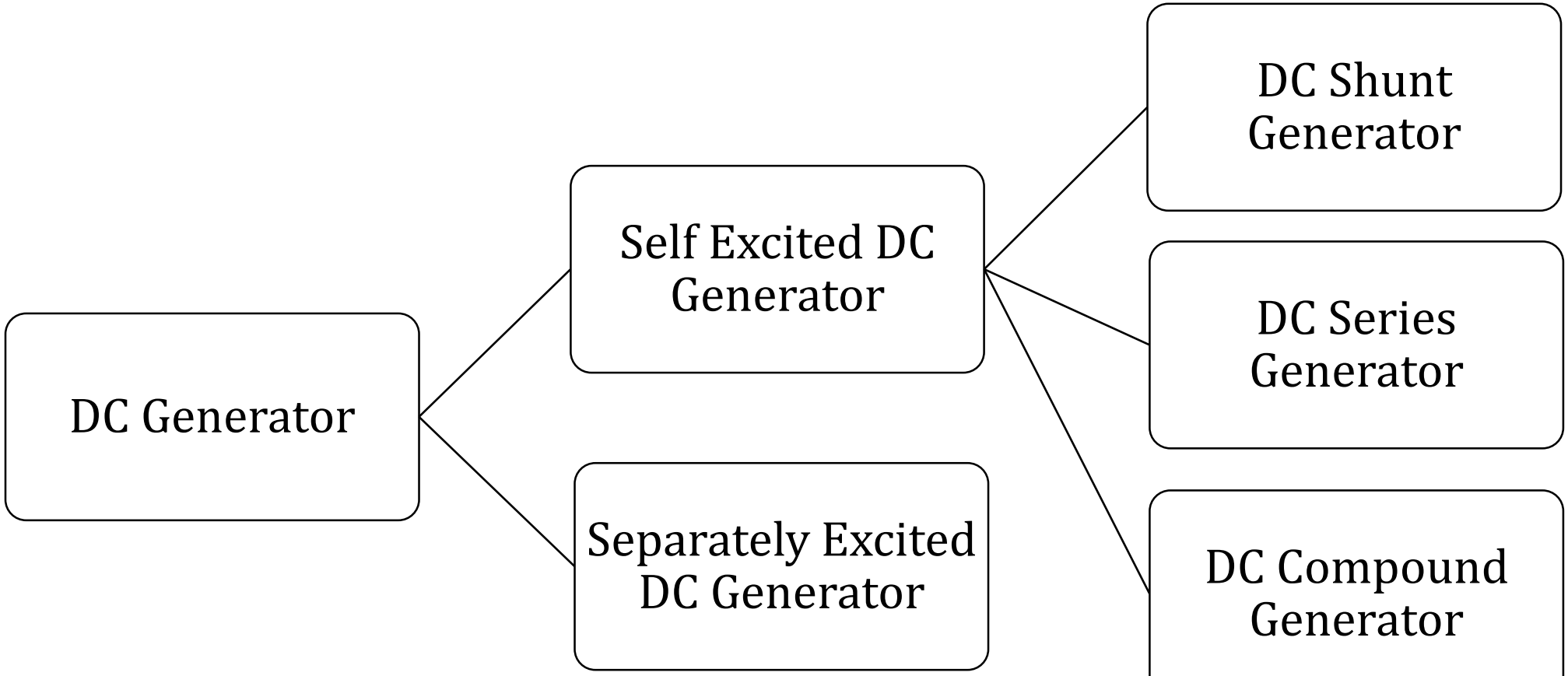
Armature Winding – Motor shape

Ia- Armature current

I_L- Load Current

V-Voltage across the load

TYPES OF DC GENERATOR



SEPERATELY EXCITED DC GENERATOR

$I_a = I_L$ where I_a is the armature current and I_L is the line current.

Terminal voltage is given as

$$V = E_g - I_a R_a \quad \ldots\ldots (1)$$

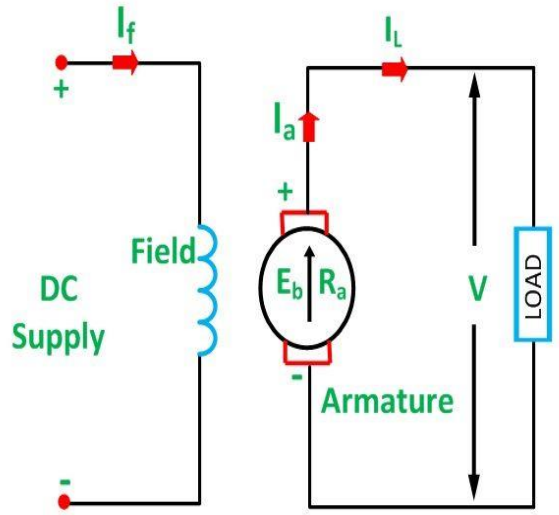
If the contact brush drop is known, then the equation (1) is written as

$$V = E_g - I_a R_a - 2v_b \quad \ldots\ldots (2)$$

- The power developed is given by the equation shown belov

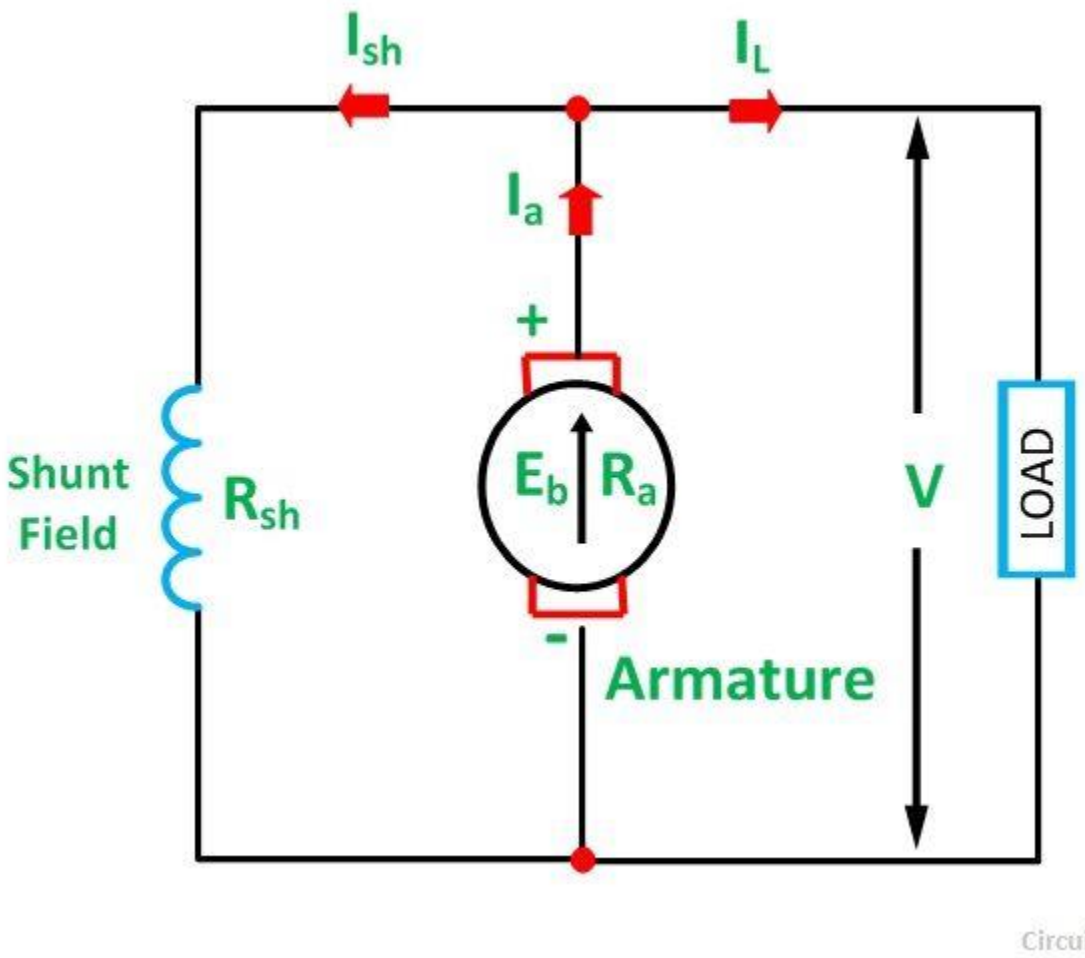
$$\text{Power developed} = E_g I_a \quad \ldots\ldots\ldots (3)$$

$$\text{Power output} = VI_L = VI_a \quad \ldots\ldots\ldots (4)$$



Circuit Globe

SELF EXCITED DC GENERATOR



Field winding is self excited

ASSESSMENT 1

1.Classify the types of DC Generators

SHUNT GENERATOR

$$I_{sh} = \frac{V}{R_{sh}}$$

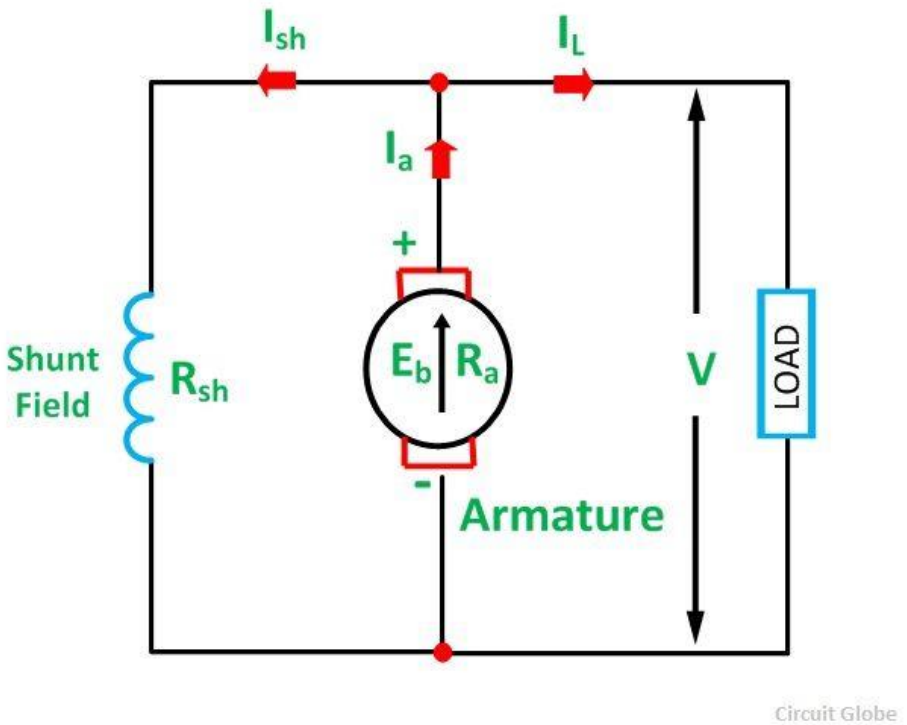
$$I_a = I_L + I_{sh}$$

$$V = E_g - I_a R_a$$

$$V = E_g - I_a R_a - 2v_b$$

Power developed $= E_g I_a$

Power output $= VI_L$



SERIES GENERATOR

$$I_{se} = I_L = I_a$$

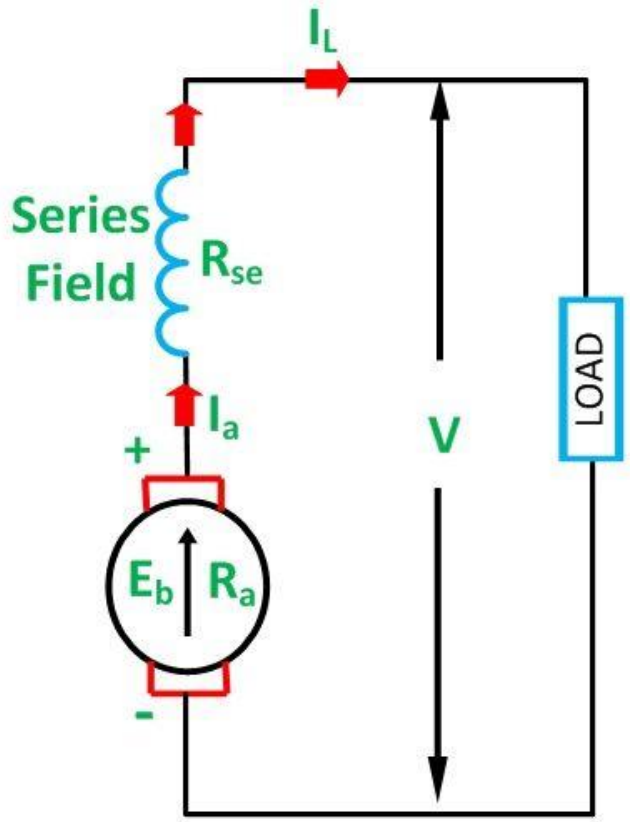
$$V = E_g - I_a R_a - I_{se} R_{se}$$

$$V = E_g - I_a (R_a + R_{se})$$

$$V = E_g - I_a (R_a + R_{se}) - 2V_b$$

Power developed $= E_g I_a$

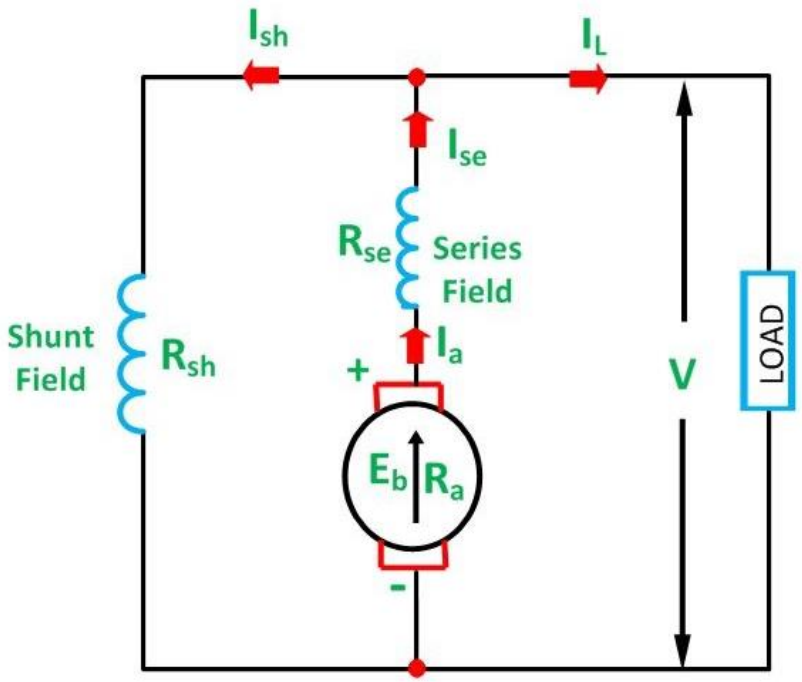
Power output $= VI_L = VI_a$

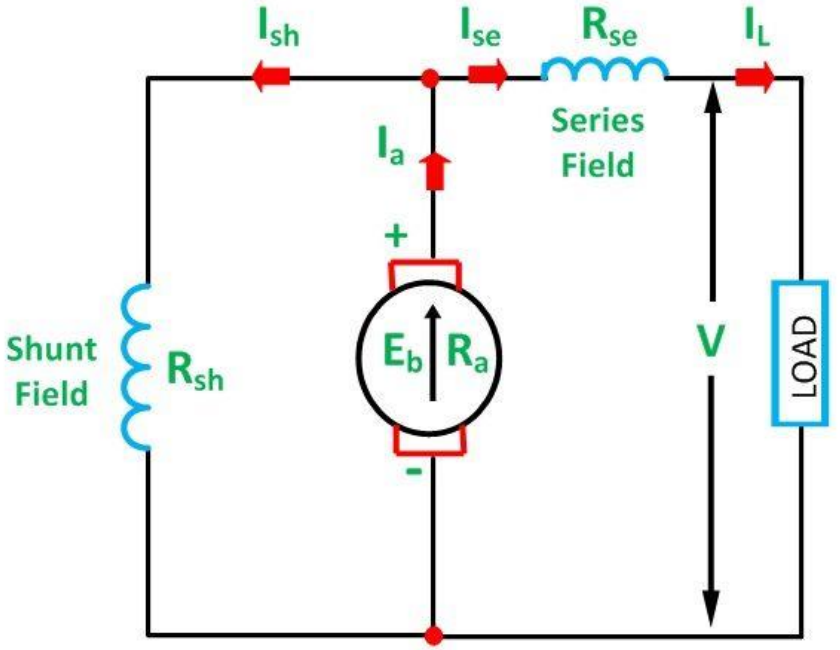


Circuit Globe

COMPOUND GENERATOR

Long Shunt Compound Wound Generator

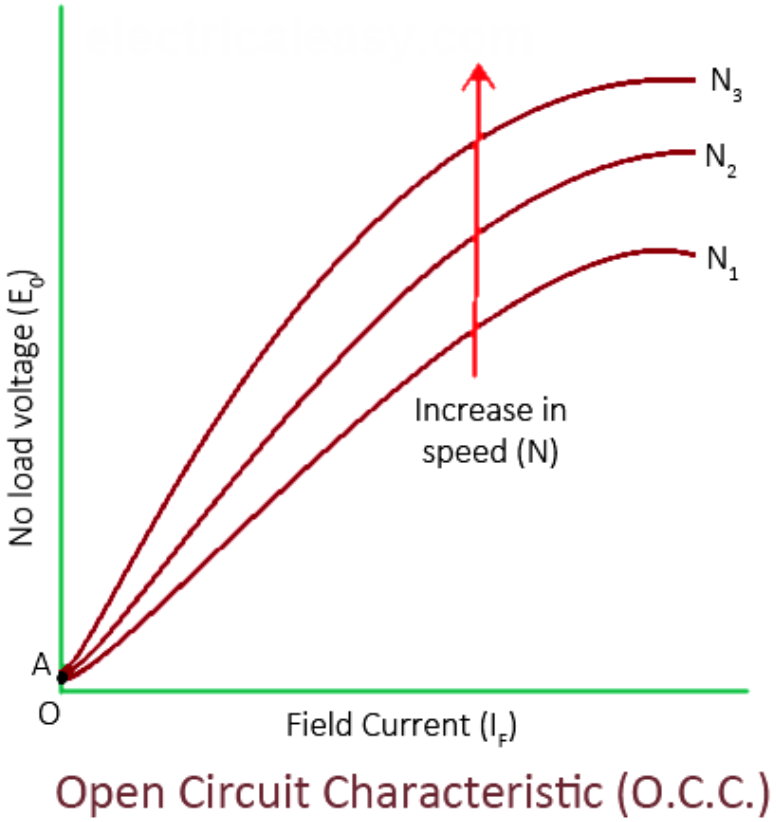




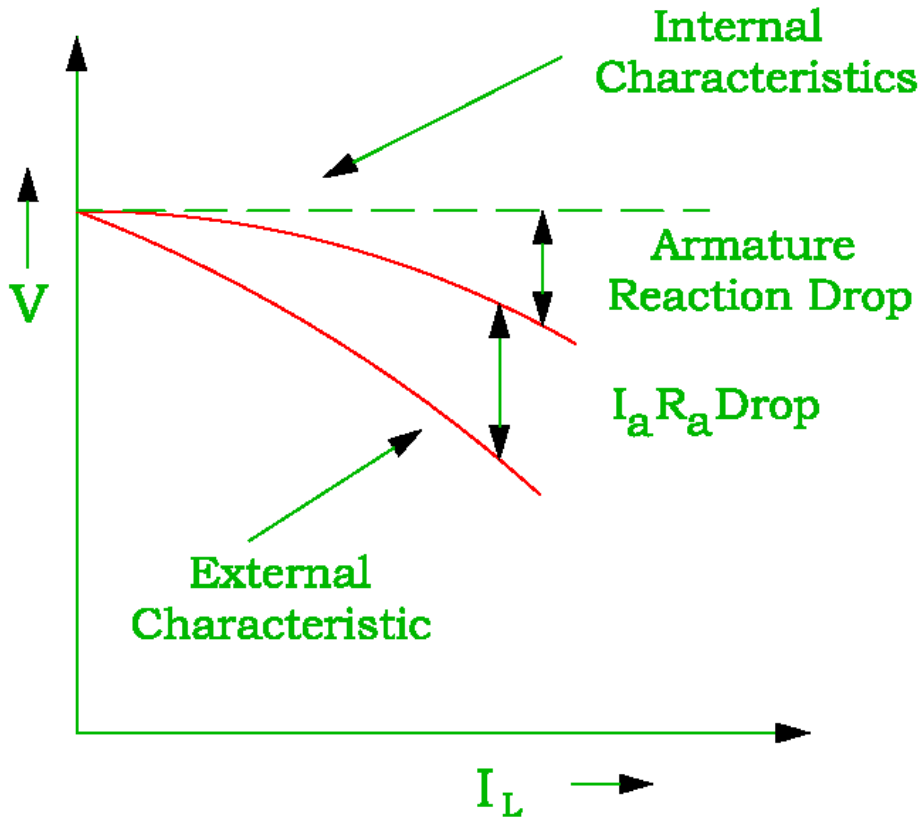
Short Shunt Compound Wound Generator

Characteristics of DC Generator

- Open Circuit Characteristics
- Load Characteristics



Open Circuit Characteristic (O.C.C.)



Assessment 2

1. Write the Voltage equation of DC Series Generator.

REFERENCES

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2. Muthu Subramanian R, Salivahanan S,“ Basic Electrical and Electronics Engineering”, Tata McGraw Hill Publishers, (2009)
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THANK YOU