DC GENERATOR

Part 3 - Note

ENTRI

Why Compound Generator

- In series wound generators, the output voltage is directly proportional with load current.
- In shunt wound generators, the output voltage is inversely proportional with load current.
- A combination of these two types of generators can overcome the disadvantages of both

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Long shunt Compound wound generator

- Shunt field winding parallel with both armature and series field winding

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

E_g = Generated voltage at armature

V = Terminal voltage

I_a = Armature current

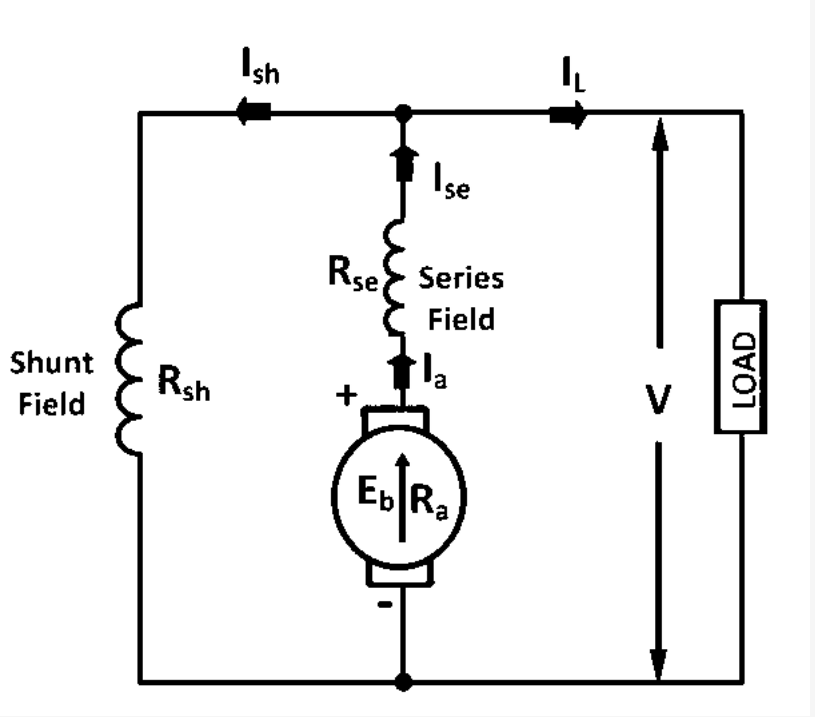
I_{se} = Series field current

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

R_a = Armature resistance

R_{se} = Series field resistance

V_b = brush drop



$$P_{generated} = E_g I_a$$

$$P_{output} = V I_L$$

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Short shunt Compound wound generator

- Shunt field winding parallel with armature only

$$E_g = V + I_a R_a + I_{se} R_{se} + 2V_b$$

E_g = Generated voltage at armature

V = Terminal voltage

I_a = Armature current

I_{se} = Series field current

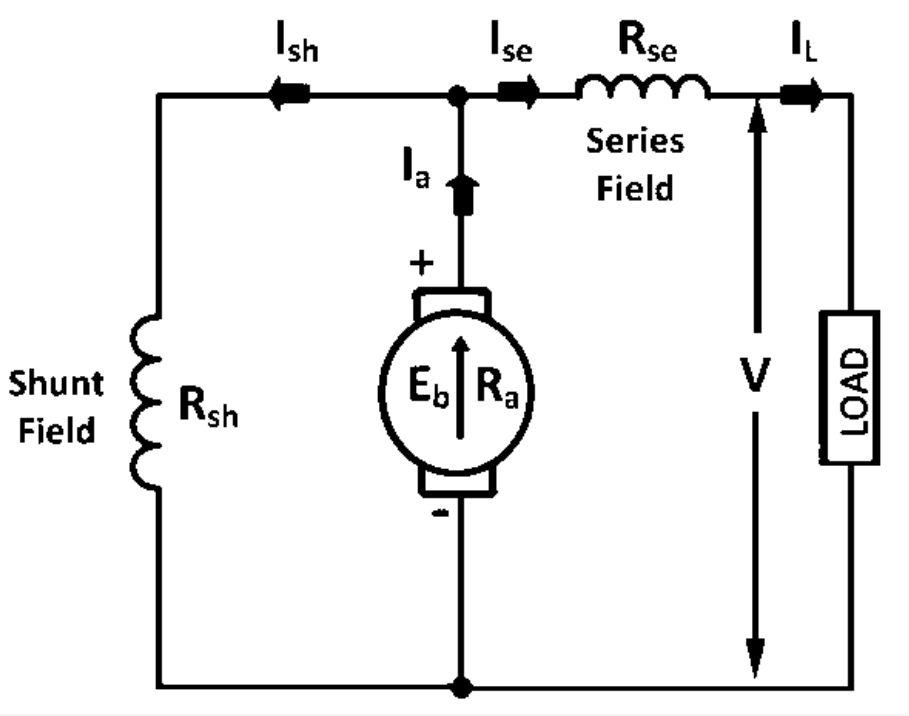
$I_a = I_L + I_{sh}$

$I_{se} = I_L$

R_a = Armature resistance

R_{se} = Series field resistance

V_b = brush drop



$$P_{generated} = E_g I_a$$

$$P_{output} = V I_L$$

Cumulative and Differential Compound Generator

Cumulative compound

- Magnetic flux produced by series winding assists the flux produced by shunt field winding
- **Total flux = $\varphi_{sh} + \varphi_{se}$**

Differential compound

- Series field flux opposes the shunt field flux
- **Total flux = $\varphi_{sh} - \varphi_{se}$**