

SNS COLLEGE OF ENGINEERING



Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EC309 ELECTRICAL MACHINES AND POWER SYSTEMS

II YEAR / 03 SEMESTER MECH & MCT

Unit 1 – DC Machines

Speed Control of DC Motor







Introduction



- ➤ A single motor can be used for different speeds for different works.
- >Smooth speed control is possible in DC shunt motor.
- >N α (Eb/ φ) = [k(V-laRa)/ φ]







SPEED CONTROL OF DC SHUNT MOTOR



- (i) Armature Control Method By changing the resistance in the armature by using rheostat control.
- (ii) Field (or) Flux Control Method By changing the field flux.
- (iii) Voltage Control Method By Varying the applied voltage.

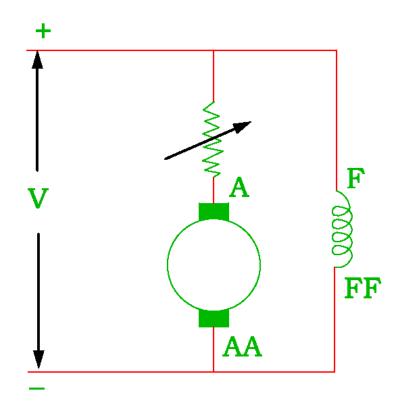


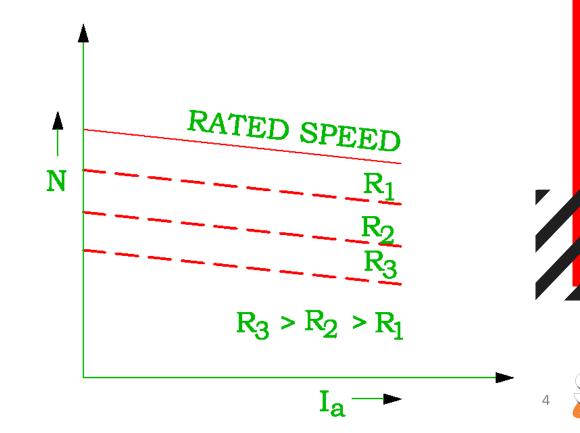


(i) Armature Control Method



- $>N\alpha[v-la(Ra+R)]/\phi$
- ➤ By increasing R, the potential drop across the armature is decreased.
- This applicable only for speed less than rated speed.









➤ Simple method

Disadvantages:

➤ Here input power is constant but output power Ebla, becomes less for lower speeds. So more power is wasted.

➤ Change in speed with change in load becomes large.

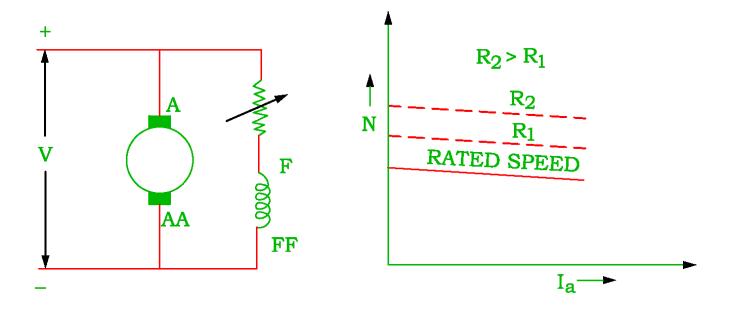


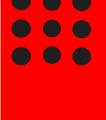


(ii) Field Control Method

By varying flux, speed can be varied by adjusting the resistance which is connected in series with field.

This method can be used for increasing the speed above its rated speed.











- Convenient and easy method
- ➤ Little power is wasted as heat
- ➤ Speed is independent of load

Disadvantages:

➤Only higher speed can be obtained i.e above the rated speed.







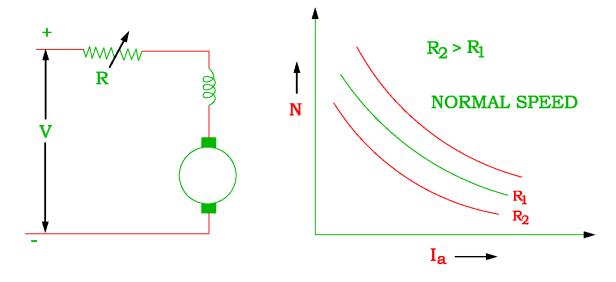


SPEED CONTROL OF DC SERIES MOTOR



(i) Armature Control Method:

- ➤ By increasing the resistance, the applied voltage across the armature terminal can be decreased.
- \triangleright If Va is decreased then Speed also decreases. (N α Eb or V)

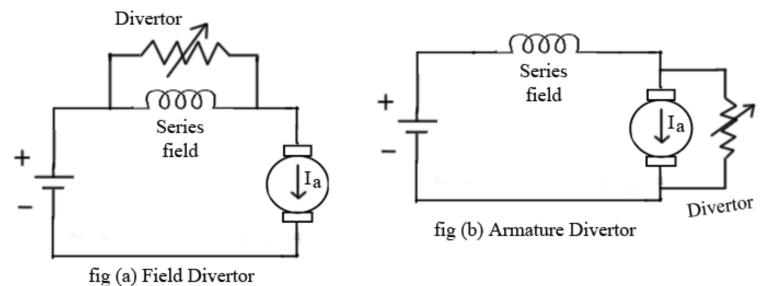




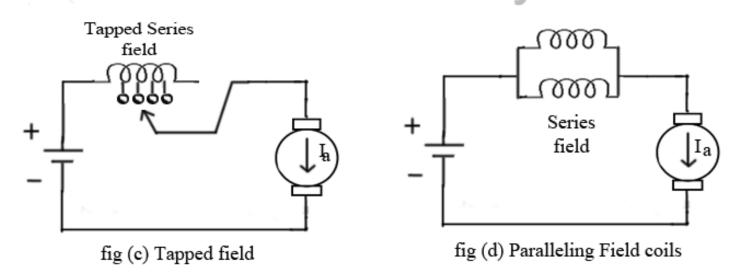




(ii) Field (or) Flux Control Method



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THANK YOU

