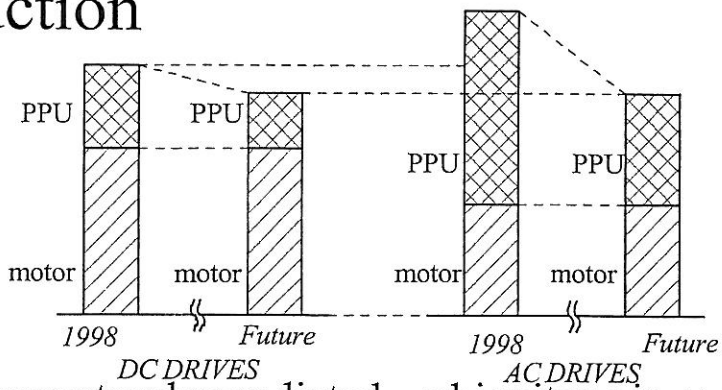
Chapter 7

DC Machines
1. Brush commutated
2. Electronically commutated

Introduction



Cost of dc vs. ac drives

- Demise prematurely predicted – ubiquitous in speed control.
- Merits
  - Cost: dc advantage over ac.
  - Ease of control – servo capability
  - Cheaper Power Processing Unit
- Drawbacks
  - Mechanical commutator and brushes require maintenance. Not a problem with electronically-commuttated machines.

Classification of DC drives

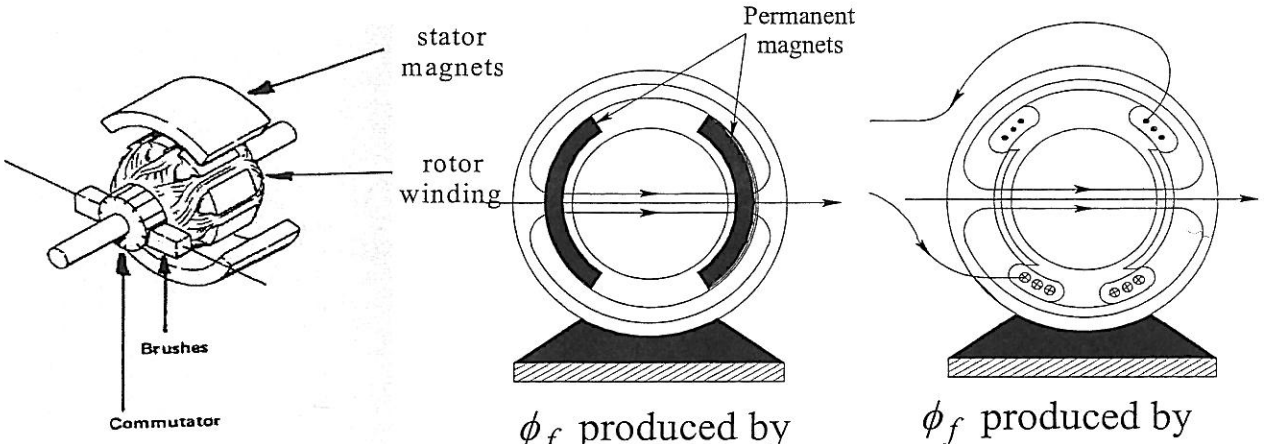
- Brushed drive
  - Field wound
    - Series or universal

      e.g. Automotive starter motors, small appliances
    - Shunt
    - Separately excited
    - Compound
  - Permanent magnet

    e.g.. Automotive wipers, sunroof, toys
- Brushless or Electronically commutated

  e.g. pentium cooling fan, white appliances

Structure of Brushed DC motors - stator



ϕ_f produced by permanent magnets

ϕ_f produced by stator winding current

- Stator
  - Establishes field flux, ϕ_f