Electronic-Circuit II
Chap 3 Power Electronics
Introduction

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Course Homepage
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Power Electronics Intro.

- One of the basic courses in Electrical & Electronics Engineering
- Power electronics is an interdisciplinary course
- To fully appreciate this course, a good knowledge on Circuit theory, electrical machines , Power Systems and Semiconductor devices is essential

Power Electronics Chapter Outline

- Introduction
- Power Semiconductor Device (Thyristors, DIAC, TRIAC)
- AC-DC Converters (Rectifiers)
- DC-AC Converters (Inverters) *[single phase]*
- DC-DC Converters (Choppers)
- AC-AC Converters (Cycloconverters) *[brief]*
- Switching Regulators
  - Buck Regulator, Boost Regulator, Buck-Boost Regulator

Reference Books and Journals

- M.H. Rashid, " *Power Electronics: Circuits, Devices and Application*" Prentice Hall of India
- Ned Mohan, "*Power electronics, Applications and Design*", John Wiley & Sons
- B.K.Bose, "*Modern Power Electronics and AC drives*", Pearson Education Inc.
- IEEE Journal on Power Electronics
- IEEE Journal on Industrial Electronics
- IEEE Journal on Power Delivery
- IEEE Journal on Industrial Applications

Introduction
Quotes from IEEE Papers

- [We now live in truly global society. In the highly automated industrial automatic front with economic competitiveness of nations, in future two technologies will dominate:
  - *Computers and power Electronics: the former providing intelligence as to "What to do" and the latter, "The means to do it."]*

Quotes from IEEE paper contd…

- Modern computers, communication and electronic systems get their life blood from power electronics
- Solid state Power electronics brought in the first electronics revolution whereas solid state power electronics brought in the second electronics revolution

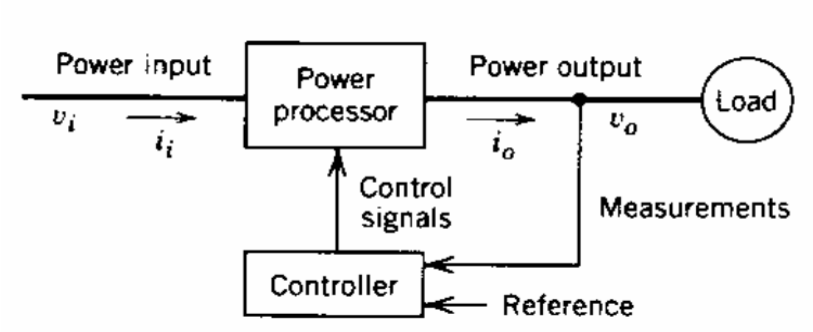
Definition and Objective of P.E.

- Defn:
  - Power electronics is the technology associated with efficient conversion and control of electric power by power semiconductor devices
- Objective of P.E.
  - To control the flow of energy from electric source to electric load

Major Applications of Power Electronics

- Electrical Machines
- Power Supplies
- Power Systems
- Energy Conservation and Lighting
- Distributed Power Generation
  - Power electronics is the enabling technology for distributed power generation
- Electrical Vehicles

Power Electronic System



Linear Electronics Vs. Power Electronics

Linear Electronics

- Devices are mostly operated in linear region
- High power dissipation
- Low efficiency
- Equipment size is large

Power Electronics

- Semiconductor devices are mostly used as switches
- Low power dissipation
- operated in non-linear regions
- High efficiency
- Equipment Size is small