DC Choppers

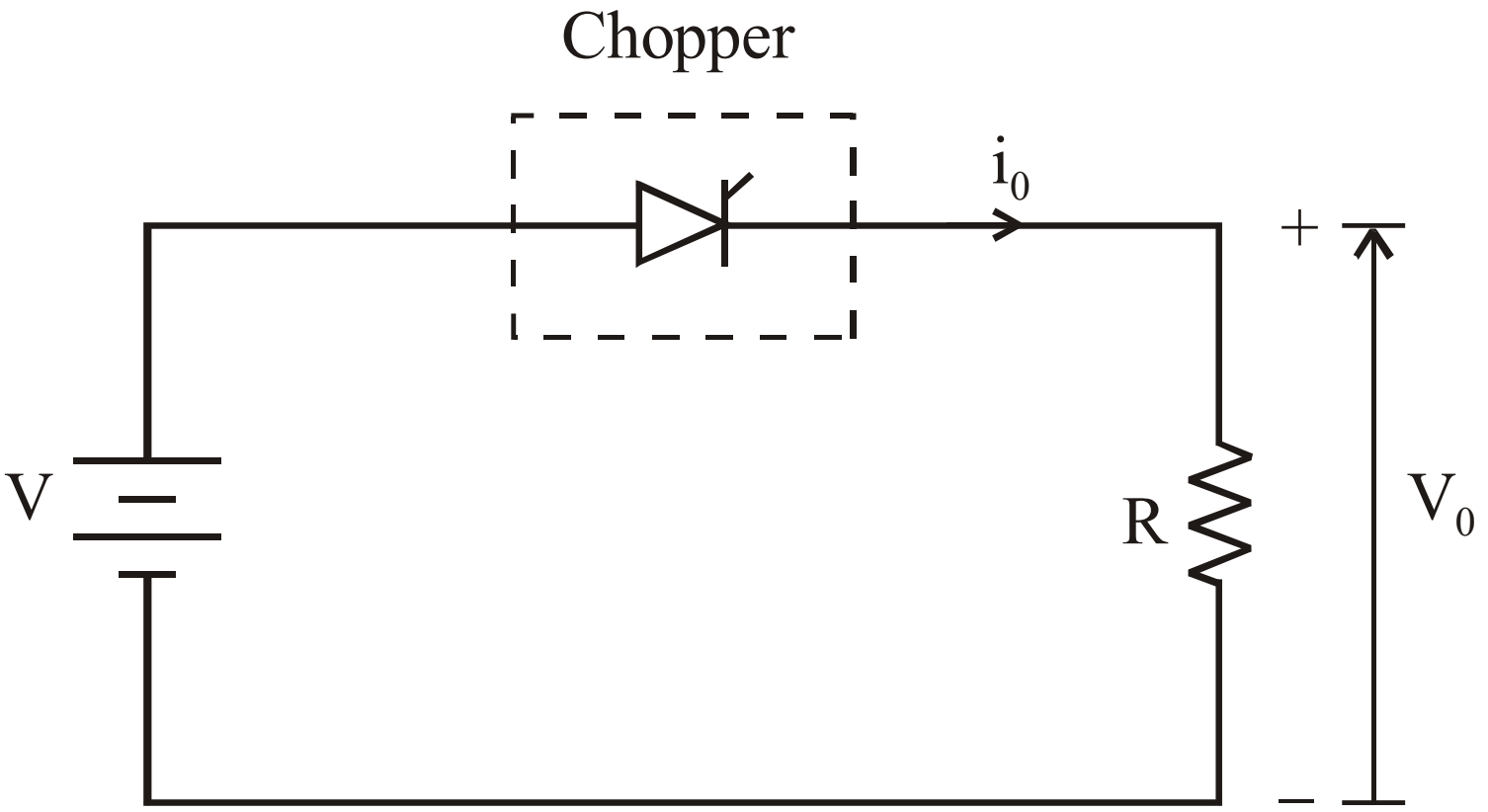
Introduction

- Chopper is a static device.
- A variable dc voltage is obtained from a constant dc voltage source.
- Also known as dc-to-dc converter.
- Widely used for motor control.
- Also used in regenerative braking.
- Thyristor converter offers greater efficiency, faster response, lower maintenance, smaller size and smooth control.

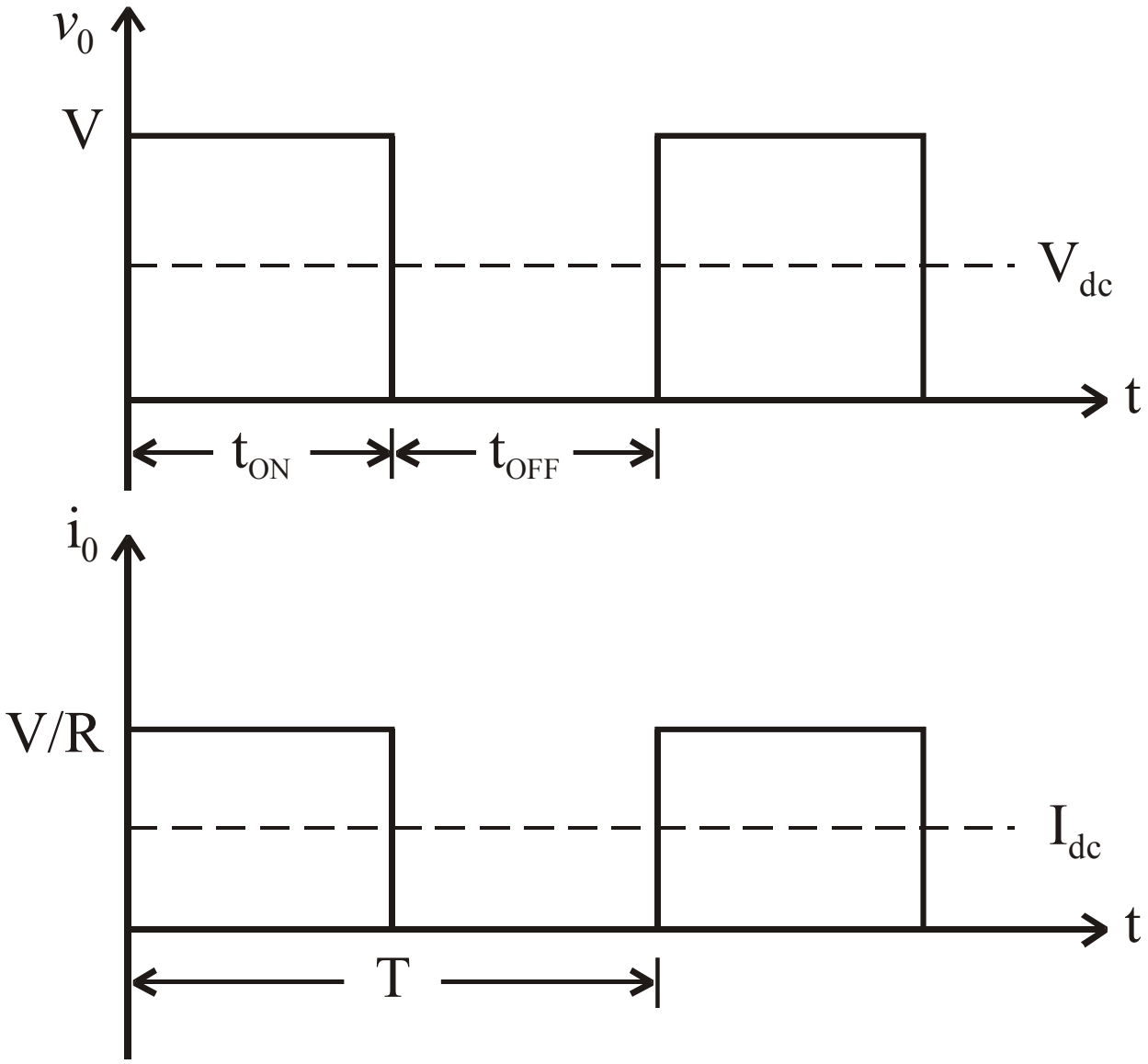
Choppers are of Two Types

- Step-down choppers.
- Step-up choppers.
  - In step down chopper output voltage is less than input voltage.
  - In step up chopper output voltage is more than input voltage.

Principle Of
Step-down Chopper



- A step-down chopper with resistive load.
- The thyristor in the circuit acts as a switch.
- When thyristor is ON, supply voltage appears across the load
- When thyristor is OFF, the voltage across the load will be zero.


v_0
V
V_{dc}
t
t_{ON}
t_{OFF}
i_0
V/R
I_{dc}
t
T

V_{dc} = *A*verage value of output or load voltage.

I_{dc} = *A*verage value of output or load current.

t_{ON} = Time interval for which SCR conducts.

t_{OFF} = Time interval for which SCR is OFF.

$T = t_{ON} + t_{OFF}$ = Period of switching or chopping period.

$f = \frac{1}{T} =$ Freq. of chopper switching or chopping freq.