

Assignment # DC/DC Converters

- Q1: With the help of circuit diagram, explain the working of step up/step-down chopper.
- Q2: Differentiate between constant frequency control and variable frequency control strategies used for chopper.
- Q3: Draw the circuit of two quadrant chopper and explain its working.
- Q4: Draw the circuit diagram of Class E Chopper and explain the working of it.
- Q5: Describe the voltage commutated chopper with associated voltage and current waveforms.
- Q6: Explain the working of current commutated chopper. Also, draw the associated waveforms.
- Q7: Mention the advantages of Jones Chopper over other chopper circuits.

Q8! Describe Morgan Chopper with associated voltage and current waveforms.

Numerical Problems

Q9 A buck converter operating at 50 kHz is fed from a 12V battery and supplies 5V to load. Neglecting switch and device losses determine:

- The maximum on-period of switch given that battery voltage varies from 13.5V in fully charged state to 10V at the end of discharge
- Battery drain current under nominal condition with 10A load.
- The value of choke required to maintain continuous current operation for a ripple current of 500mA and worst case battery voltage condition
[MDSingh Ex 8.24]

Q10! Design the Jones chopper circuit for optimum frequency considerations to meet the following specifications:

Source voltage $E_{dc} = 200\text{V}$, Load current $I_o = 50\text{A}$ and $f_g = 200\text{ Hz}$
[MDSingh Ex 8.22]