8.10 Variable DC link Inverter
The circuit diagram of a variable DC-link inverter is shown in Fig.8.18. This circuit can be divided into two parts namely a block giving a variable DC voltage and the second part being the bridge inverter itself.

The components Q, Dm, L and C give out a variable DC output. L and C are the filter components. This variable DC voltage acts as the supply voltage for the bridge inverter.
The pulse width (conduction period) of the transistors is maintained constant and the variation in output voltage is obtained by varying the DC voltage. The output voltage waveforms with a resistive load for different dc input voltages are shown in Fig. 8.19.

We know that for a square wave inverter, the rms value of output voltage is given by,

\[ V_0 \text{ (rms)} = V_{dc} \text{ volts} \]

Hence by varying \( V_{dc} \), we can vary \( V_0 \) (rms)

One important advantage of variable DC link inverters is that it is possible to eliminate or reduce certain harmonic components from the output voltage waveform.

The disadvantage is that an extra converter stage is required to obtain a variable DC voltage from a fixed DC. This converter can be a chopper.
Prob 2: The 1 φ half bridge inverter using transistors has a resistive load of 2 Ω. The DC supply is 24V. Calculate:
(i) RMS output voltage at fundamental frequency
(ii) Output power
(iii) Average and peak current
(iv) Peak reverse blocking voltage of each transistor.

Soln. :
(i) Refer to Equation (9.3.12)
$$V_{o1 \text{rms}} = 0.45 \times V = 0.45 \times 24$$
$$= 10.8 \text{ volts}$$

(ii) Output power = \(\frac{V_{o \text{rms}}^2}{R}\) But \(V_{o \text{rms}} = \frac{V}{2} = 12 \text{ volts}\)
$$\therefore \text{Output power} = \frac{(12)^2}{2} = 72 \text{ watt}$$

(iii) Peak load current = \(\frac{V}{2R} = \frac{24}{4}\)
$$= 6 \text{ Amp}$$

(iv) Average load current = 0

(v) Peak reverse blocking voltage of each transistor = V = 24 volts.