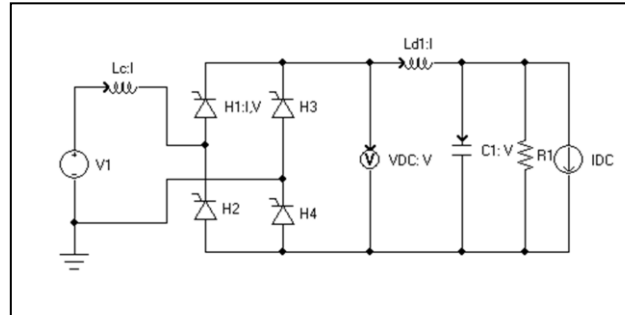


Single phase Thyristor Bridge converter (B2T)

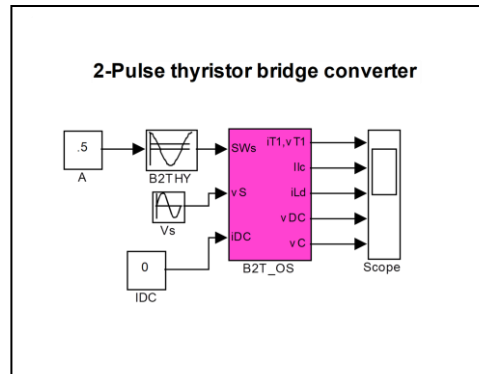
The single phase thyristor bridge converter (B2T) consists of four thyristors arranged to form two legs. Since it does not need the midpoint of a transformer, it can be connected directly to the supply circuit. However a transformer can be used for electrical isolation and voltage-level change.



Single phase thyristor bridge converter (B2T)

The diagonally pairs of thyristors $H1$ and $H4$ will be fired at angle α during the half-cycle when the anode to cathode voltage is positive. At angle $\alpha + 180$, when thyristors $H2$, $H3$ are fired, a reverse voltage is applied on thyristors $H1$ and $H4$ turning them off. Once the thyristors are fired the load voltage follows the profile of the ac voltage.

The Figure below shows the **Simulink** model of the single phase bridge converter (B2T) including its control. The sine-wave generator “Vs” delivers the value of the single phase voltage source. The constant Block “A” delivers the value of the modulation index A . It is defined as the ratio of the desired average dc voltage to the ideal dc voltage V_d/V_{di} in continuous current operation mode ($A = \cos \alpha$).



The converter control block “B2THY” from the converter control library contains two firing angle control blocks “THY-Con and THY-Con1” for the two thyristors-pairs of the converter, they deliver the firing signals for the four thyristors according to the value of the modulation index. It works on the principle of the cosine wave crossing method illustrated below.

The firing angle α of thyristors $H1$ and $H4$ are generated by the crossover point of the modulation index A and the modulation voltage $u1$ as

$$A = \cos \alpha$$

The firing angle $\alpha + \pi$ of thyristors $H2$ and $H3$ is generated by the crossover point of the modulation index A and the modulation voltage $u2$

$$A = -\cos (\alpha + \pi)$$

The converter power circuit is modeled using C-S-function.

