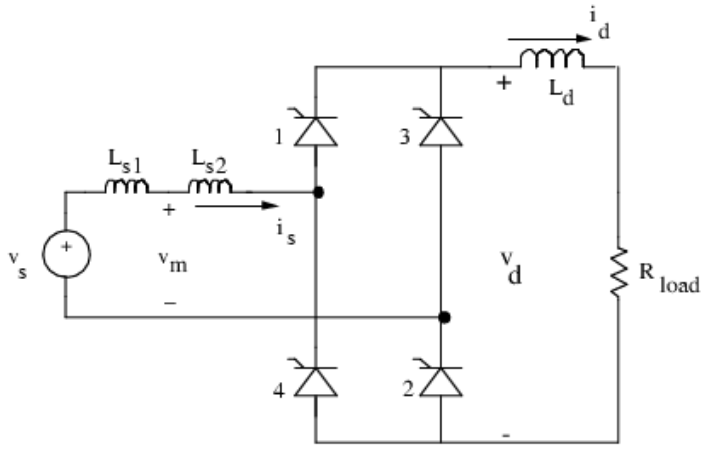
LAB 02 - THYRISTOR RECTIFIER BRIDGE



Nominal values: V_s(rms) = 120 V at 60 Hz
L_{s1} = 0.2 mH
L_{s2} = 1.0 mH
L_d = 20 mH
R_{load} = 5 Ω
delay angle α = 45°

1. (a) Obtain v_s, v_d and i_d waveforms.
   (b) Obtain v_s and i_s waveforms.
   (c) Obtain v_m and i_s waveforms.

2. Replace R_{load} and L_d by a DC current source I_d equal to average value of i_d. Make L_{s1}=L_{s2}=0

   By means of Fourier analysis of i_s, calculate I_{sRMS}, the first harmonic component I_{s1RMS}, %THD in the input current, the input displacement power factor (DSP) and the input power factor PF. Compare with the theoretical values.

3. Make L_{s1}=0.2mH and L_{s2}=1.0 mH. From the plots, obtain the commutation interval u. Compare with the theoretical value.

4. Verify that average DC value V_d is given by

$$V_d = 0.9\ V_s \cos\alpha - \frac{2\omega L_s}{\pi}\ I_d.$$

5. Make delay angle α=135°. Verify that average DC value V_d is now negative