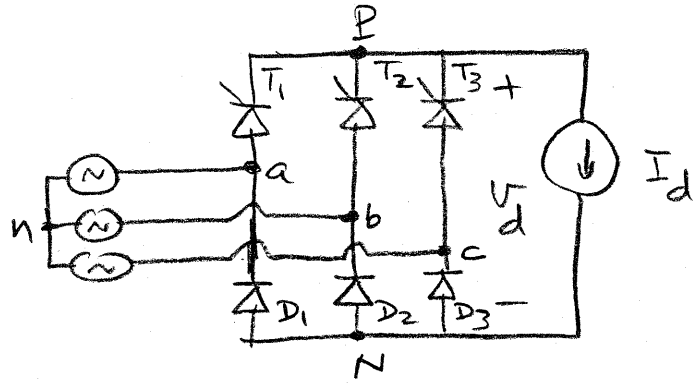
Problem 6-16



We will compare this to the full-controlled bridge designated by subscript FB. Also, $V_{do} = \frac{3\sqrt{2}}{\pi} V_{LL}$

Here, $V_{Pn} = V_{Pn(FB)} = \frac{1}{2} V_{do} \cos\alpha$

$$V_{Nn} = V_{Nn(FB)}^{(\text{with } \alpha=0)} = -\frac{1}{2} V_{do}$$

$$\therefore \quad V_d = V_{Pn} - V_{Nn} = \frac{1}{2} V_{do} (1 + \cos\alpha)$$

For $V_d = \frac{1}{2} V_{do} (1+\cos\alpha) = \frac{1}{2} V_{do}$

$$\therefore \quad (1+\cos\alpha) = 0$$

and $\alpha = 90^\circ$

Note that v_d waveform is the same as in Prob 6-15. Therefore, V_d is also the same. Also, i_a waveform is identical with exactly the same DPF, THD_i and PF, as in Prob 6-15. However, the devices conducting are different

as shown in the figure below.