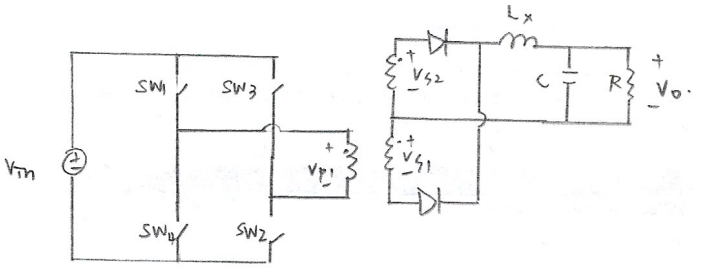
Design a Full bridge converter to obtain a $20\ v$ output voltage from a $170\ v$ input while operating the converter at $20\ kHz$ switching frequency and having a maximum of $5\ \%$ output voltage ripple.



$V_o = 20V$

$V_{in} = 170V$.

$f_s = 20\,kHz$.

$\frac{\Delta V_o}{V_o} = 5\%$.

$\frac{V_o}{V_{in}} = 2D\left(\frac{N_s}{N_p}\right) = \frac{20}{170} \Rightarrow D \cdot \frac{N_s}{N_p} = 0.0588 \Rightarrow$ assume $N_p/N_s = 5$

$\Rightarrow D = 0.294$

$I_{Lx\,avg} = I_R = \frac{V_o}{R} \Rightarrow$ assume $R = 10\Omega$

$\Delta i_{Lx} = \frac{V_o(1-D)}{L f_s} \Rightarrow L \geq \frac{(1-D)R}{2f_s} \Rightarrow$ assume $L = 1.8\times10^{-4}\,H$

$\frac{\Delta V_o}{V_o} = \frac{1-D}{8Lf_s^2C} = 5\% \Rightarrow \frac{1-D}{LC} = 1.6\times10^{8} \Rightarrow$ assume $C = 2.45\times10^{-5}\,F$

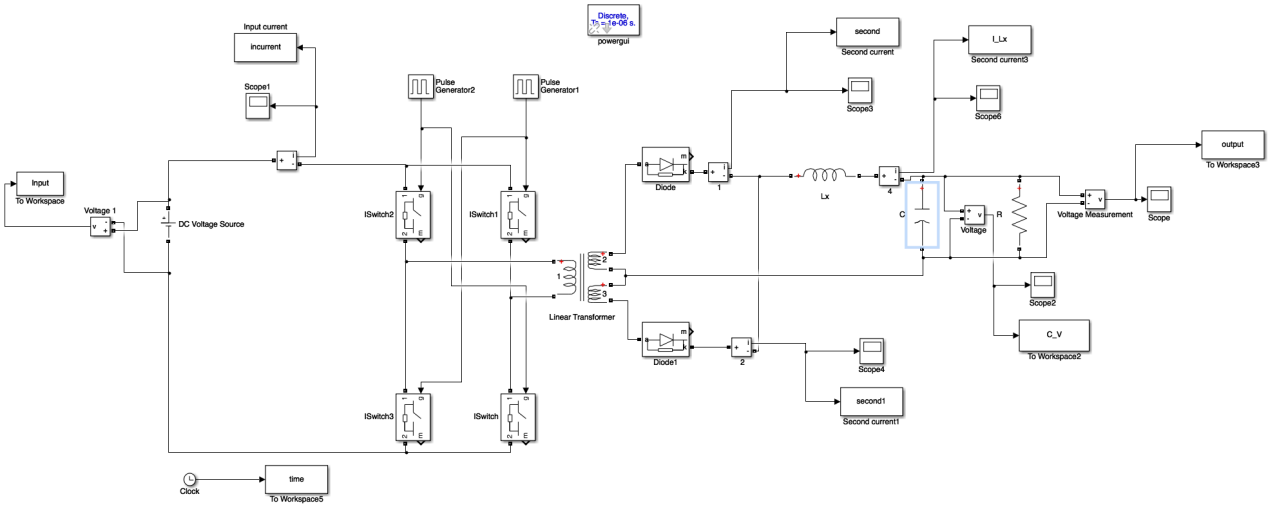


fig1. simulation of full bridge converter