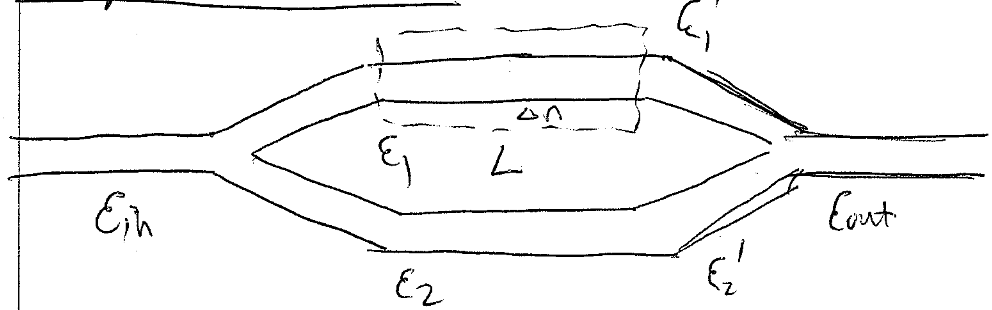
amplitude modulators



$$\mathcal{E}_1 = \frac{1}{\sqrt{2}}\mathcal{E}_{in} \qquad \mathcal{E}_2 = \frac{1}{\sqrt{2}}\mathcal{E}_{in}$$

$$\mathcal{E}_1' = \frac{1}{\sqrt{2}}\mathcal{E}_{in}e^{-j(\beta+\Delta\beta)L} \qquad \mathcal{E}_2' = \frac{1}{\sqrt{2}}\mathcal{E}_{in}e^{-j\beta L}$$

$$\mathcal{E}_{out} = \frac{1}{\sqrt{2}}\mathcal{E}_1' + \frac{1}{\sqrt{2}}\mathcal{E}_2' = \left(\frac{1}{2}\mathcal{E}_{in}e^{-j\Delta\beta L} + \frac{1}{2}\mathcal{E}_{in}\right)e^{-j\beta L}$$

$$= \frac{1}{2}\left(e^{-j\Delta\beta L}+1\right)\mathcal{E}_{in}e^{-j\beta L}$$

$$= \frac{1}{2}\left(e^{-j\Delta\beta L/2} + e^{j\Delta\beta L/2}\right)\mathcal{E}_{in}e^{-j\beta L}e^{-j\Delta\beta L/2}$$

$$= \cos(\Delta\beta L/2)\,\mathcal{E}_{in}\,e^{-j\cdots}$$

$$\frac{I_{out}}{I_{in}} = \cos^2(\Delta\beta L/2)$$

switches

design half beat length $\Delta n = 0$
$\Delta n > 0$ power transfers back to output 1
"digital" because no over-switching