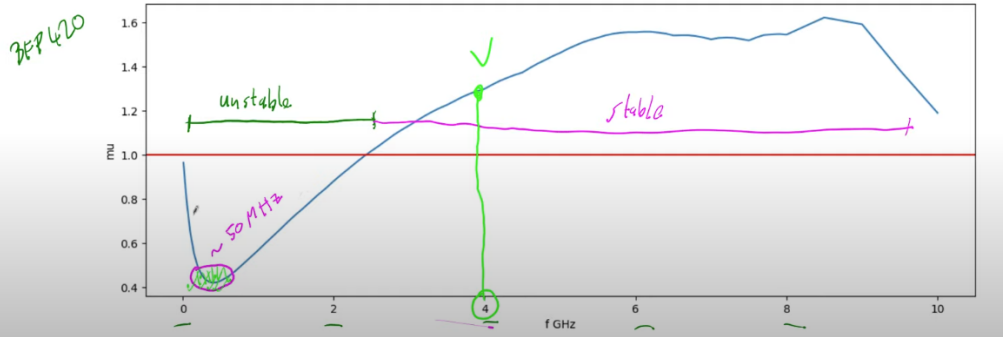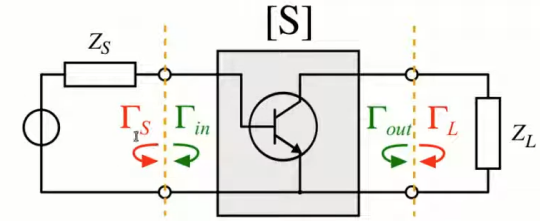## Important Note

It's not sufficient to check the stability at your operating frequency. Oscillations do not care about your design frequency.

They start because they can!

Maximize Gain

$$G_S = \frac{1 - |\Gamma_S|^2}{|1 - \Gamma_{in}\Gamma_S|^2}, \quad G_0 = |S_{21}|^2, \quad G_L = \frac{1 - |\Gamma_L|^2}{|1 - S_{22}\Gamma_L|^2}$$

Overall transducer gain is

$$G_T = G_S G_0 G_L$$

Design for Maximum Gain (Conjugate Matching)

- For a given transistor, the gain G_0 is fixed.
- The total gain of the amplifier is then determined by G_L and G_S of the matching sections.
- The maximum gain for

$$\Gamma_{in} = \Gamma_S^*, \tag{22}$$

$$\Gamma_{out} = \Gamma_L^*, \tag{23}$$

Assuming lossless matching sections, the maximum is

$$G_{Tmax} = \frac{1}{1 - |\Gamma_S|^2}|S_{21}|^2\frac{1 - |\Gamma_L|^2}{|1 - S_{22}\Gamma_L|^2}. \tag{24}$$