

6.1.1 SNR

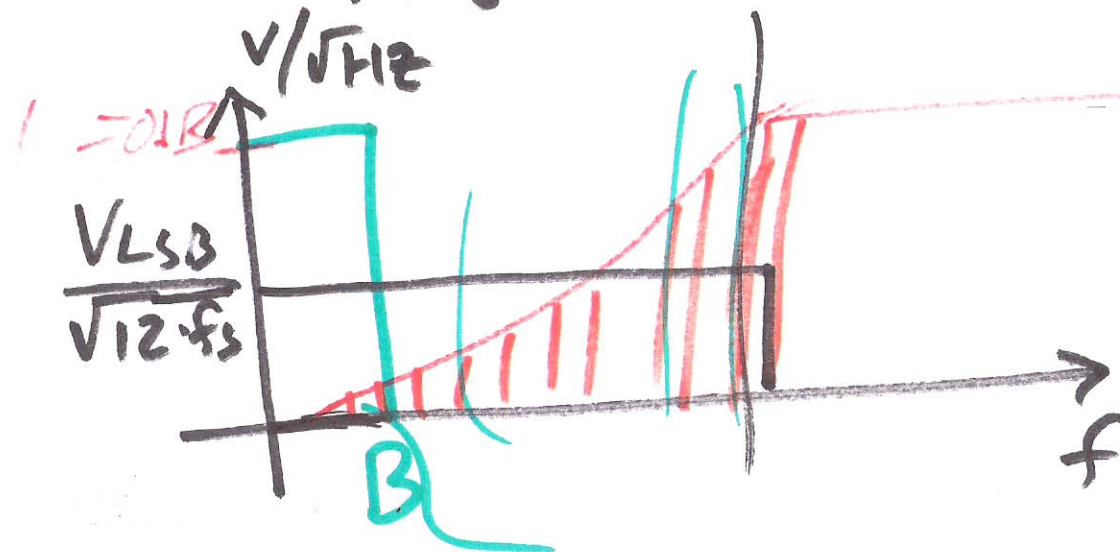
passive noise -
shaping.

$$V_{out} = \frac{1}{1+j\omega RC} V_{in} +$$

$$\frac{j\omega RC}{1+j\omega RC} \cdot V_{qp}(f)$$

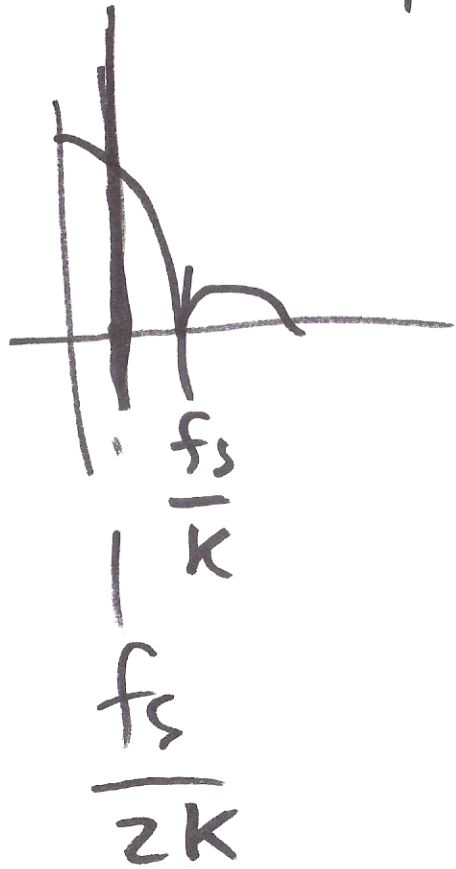
$$+ \frac{-2V_{ref}}{1+j\omega RC}$$

$$|V_{qp}(f)|^2 \cdot |NTF(f)|^2$$



$$V_{\text{NOISE, rms}}^2 = 2 \int_0^B |NTF(f)|^2 \cdot |V_{\text{REF}}|^2 \cdot df$$

EQ. (6.13)



$$= 2 \frac{V_{\text{LSB}}^2}{12f_s} \int_0^B (2\pi f \cdot RC)^2 \cdot df$$

$$= 2 \frac{V_{\text{LSB}}^2}{12f_s} (2\pi RC)^2 \cdot \frac{1}{3} f^3 \Big|_0^B$$

$$= 2 \frac{V_{\text{LSB}}^2}{12f_s} (2\pi RC)^2 \cdot \frac{1}{3} B^3 \left(\frac{f_s}{2K} \right)$$

$$V_{\text{NOISE, rms}}^2 = \frac{V_{\text{LSB}}^2}{12} (2\pi RC)^2 \cdot \frac{f_s^2}{12K^3}$$

$$SNR_{ideal} = 20 \log \frac{V_P / \sqrt{2}}{V_{noise, rms}}$$

$$= 6.02N + 1.76 - 18.06 + 30 \log k$$

$$-18.06 + \cancel{30 \log 8}^{27} = 9dB$$

$$-18.06 + \cancel{30 \log 16}^{36} = 18dB$$

↑ 9dB
1.564