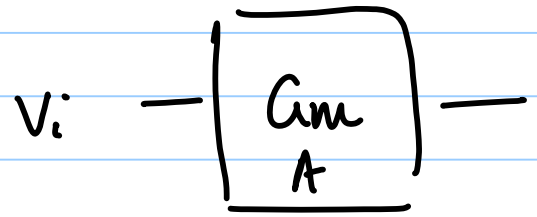
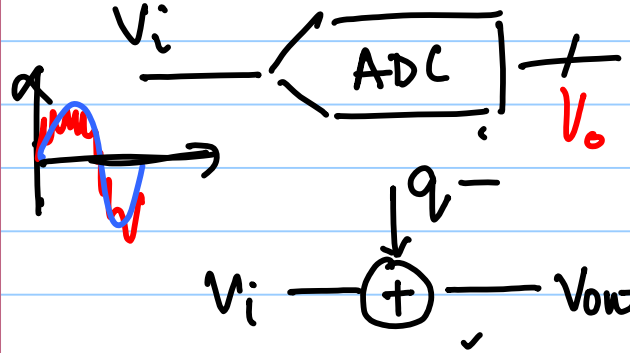
Lecture # 39

Note Title 13-04-2022

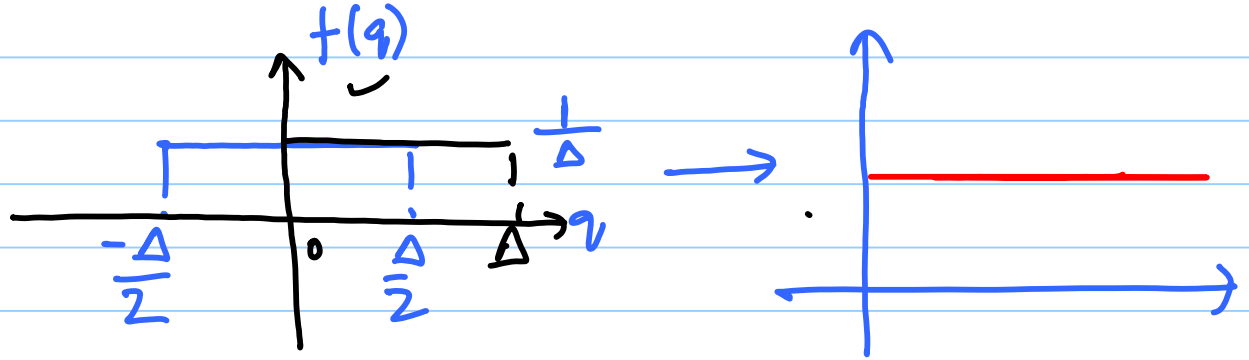


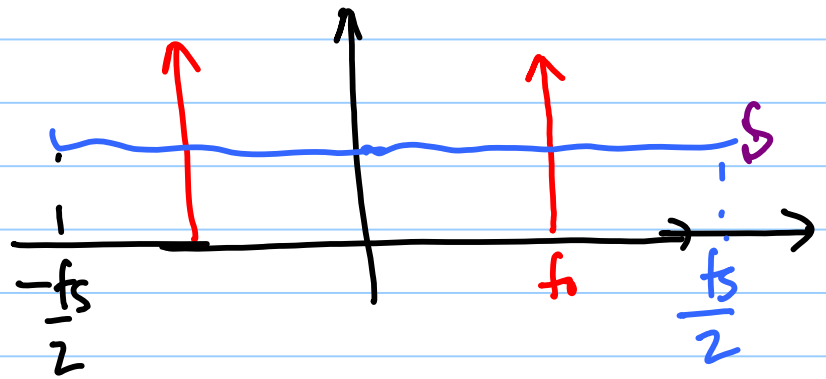
$G_m \cdot V_i + \beta V_i^2 + \gamma V_i^3$

SNR for ADC



$V_{out} = V_i + q$

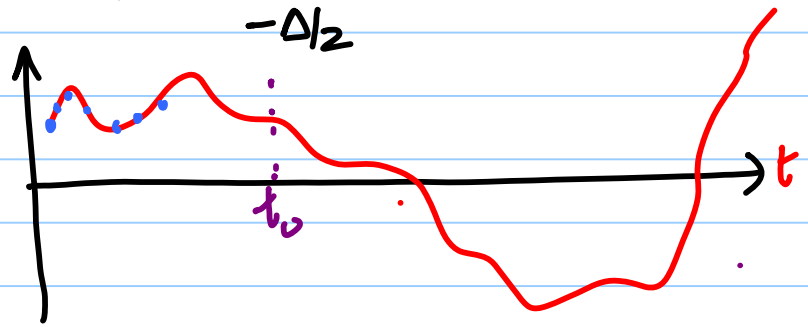




$S \times f_s = \frac{\Delta^2}{12}$

$E[q] = 0$

$E[q^2] = \int_{-\Delta/2}^{\Delta/2} \frac{1}{\Delta} \cdot q^2 \, dq = \frac{\Delta^2}{12}$ ✓



$V_i = A \sin(\omega t)$

Signal Power $= \frac{A^2}{2}$ ✓

Noise Power $= \frac{\Delta^2}{12}$

Signal-to-Noise Ratio $= \frac{A^2/2}{\Delta^2/12}$

$SNR = 10 \log_{10}\left(\frac{A^2/2}{\Delta^2/12}\right)$ [dB]

SQNR

$\Delta = \frac{2A}{2^N}$

$SNR = 10 \log_{10}\left(\frac{A^2/2}{4A^2/2^{2N} \cdot 12/3}\right)$

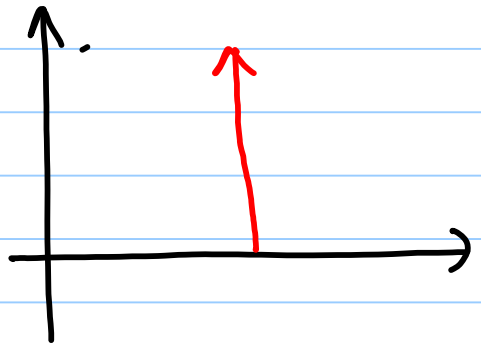
$= 10 \log_{10}\left(\frac{3 \times 2^{2N}}{2}\right)$

$= 1.7 + 2N \times 3.01$

$= 6.02N + 1.7$

$= 6.02 ENOB + 1.7$

$V_{in} = A\sin(\omega_0 t)$



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