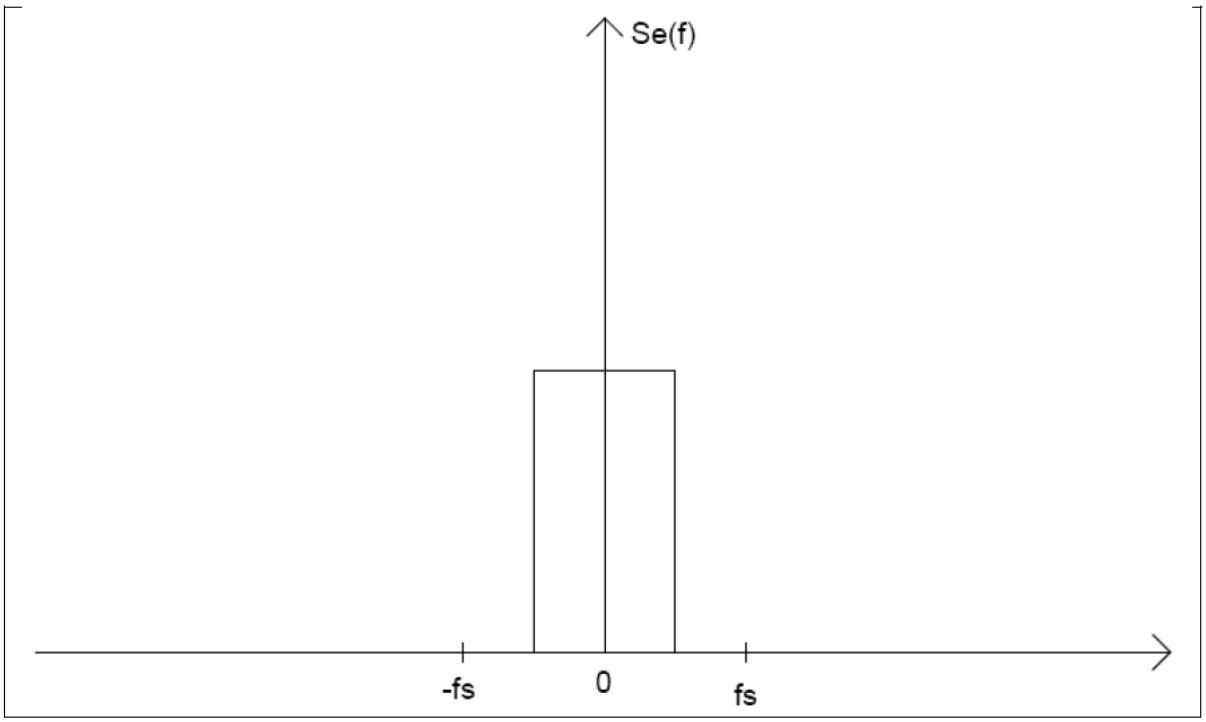
Q.1
In Figure 12.8 of Razavi's, consider the switching noise (i.e. ideal amplifier assumed), if CH = 2 pF and VDD = 3V, what is the sampling noise power, max SNR and resolution (number of bits)?
Repeat the question if you have a differential sampling switch.

Q.2 (Q.3a of exam 2009)

Se(f) is assumed to be the spectral density of the quantization noise, when the quantizer is modeled as in chapter 14.1, in our book by Johns & Martin, and the sampling frequency is f_s. Can you explain what could happen to the dynamic range if a sampling frequency of $f_s/2$ was chosen instead? Illustrate in a figure with similarities to the one below, if you like.



Q.3 (4.4 of Maloberti's)

Determine the transistor sizing of an MOS preamplifier which differential pair uses $300\,\mu A$ bias current and uses $300\,mV$ overdrive. The variance of the offset must be $1\,mV$ with dominant contribution from the tem controlled by the process parameter $A_{VT} = 1.6\,mV/\mu$.

Q.4 (4.8 of Maloberti's)

Determine the optimum splitting of the bits in a 10-bit two step converter assuming as quality factor the power consumption. The converter runs at 200 MHz and used $V_{ref} = 2\,V$. The power consumption of a comparator is given by $P_{comp} = 0.3 + 10/\Delta[mW]$ where Δ is the resolution required at the input of the comparator. The power of the residue generator that obtains an amplification by $2^{N_{MSB}}$ is $2 + 1.2 \cdot 2^{N_{MSB}} mW$.