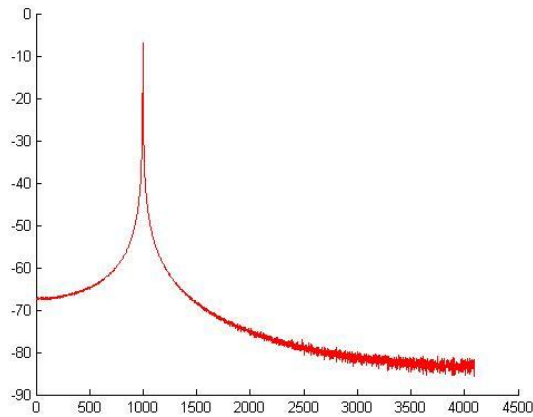


Examination in Integrated A/D and D/A Converters, ETI220

14.00-19.00, Thursday, Dec. 16, 2010

I. Basic questions about A/D converters

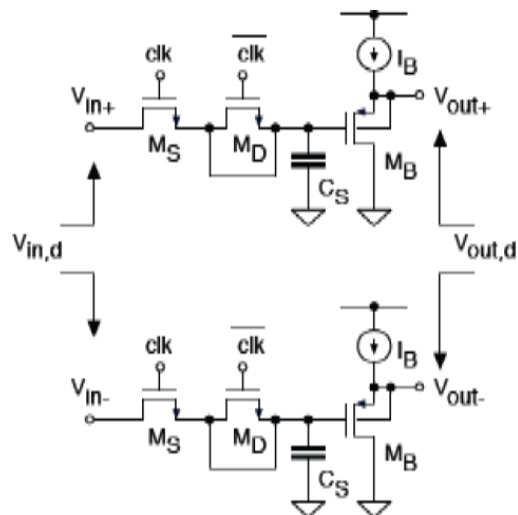
a) What went wrong in the fft below? Are there ways to avoid it?



b) Explain what the kT/C noise is.

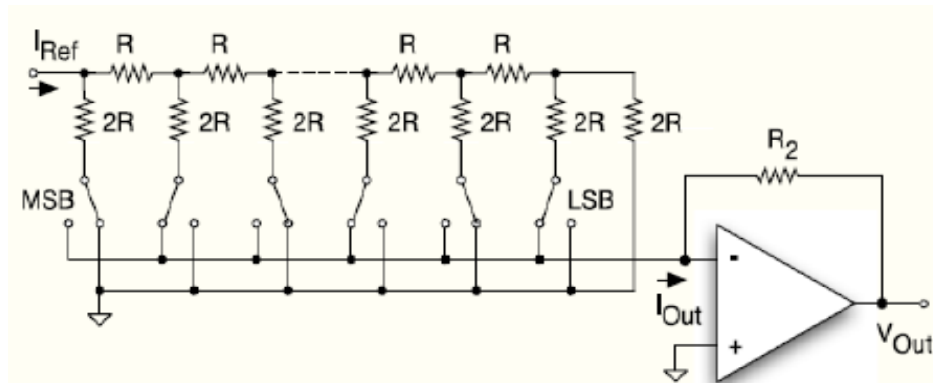
c) For what kind of applications is the SFDR of a converter a relevant performance parameter?

d) Explain what this circuit does, what the function of MOS M_D is, and why Bulk and Source of M_B are connected together.

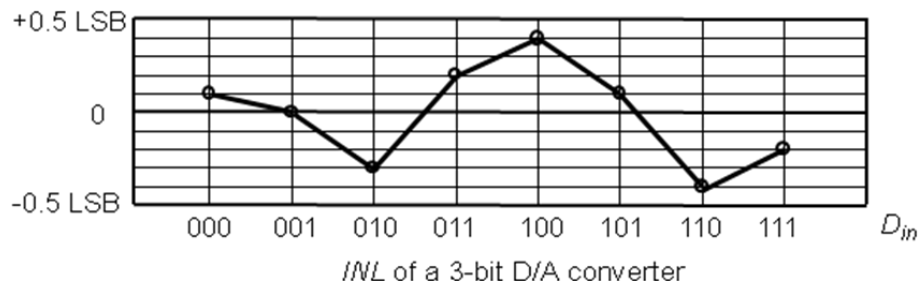


II. Specific questions about converters

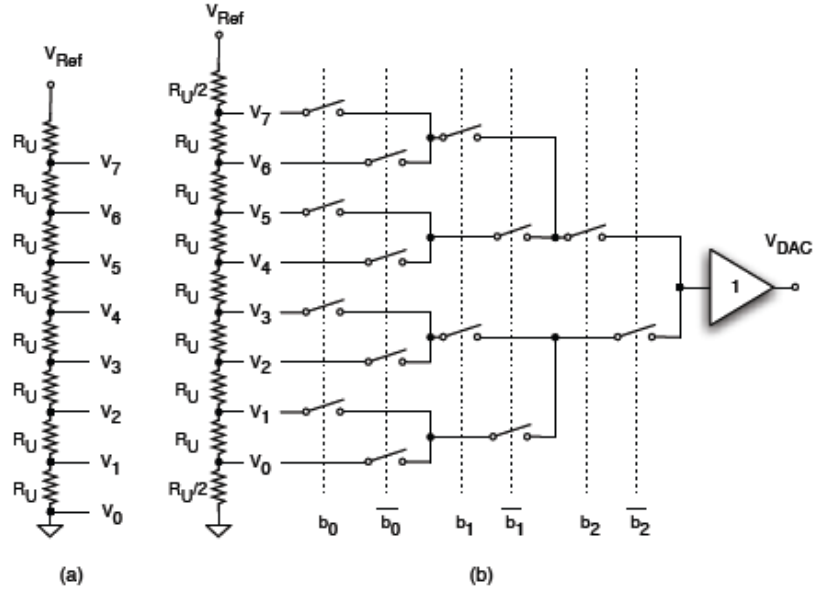
- a) Describe a pipeline A/D converter, and explain in detail how a 1.5b pipeline A/D converter stage works.
- b) Below you see an R-2R current-based DAC. Show, by means of an example, that this DAC may be non-monotonic.



- c) This is the INL curve of a 3-bit DAC. Draw the corresponding DNL curve.



- d) The resistive divider DAC below, loaded by a number of switches to implement the D/A conversion, may introduce distortion, even if all components are perfectly matched. Show how.



- e) Below you the fft of a sinusoidal signal together with white noise. The amplitude of the signal is -3dB. Give an estimate of the SNR and of the ENOB of the converter.

