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| **Noms:** |  |
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| **Lloc treball:** |  |
| **Grup:** |  |

1. With Nbits=5, how many quantization levels are used to represent the interval [-1, 1]? Measure the dynamic range of the quantization noise in Fig. 3.3. Is it what you were expecting from a theoretical point of view? What is the representation level of samples that are close to 0?
2. Describe the distortion you perceive. How would you rate the signal quality in a scale from 1 to 5?

1. Describe the difference between both functions. Could you explain why the actual SNR is zero when Nbits=1?

1. For which set of bit numbers the assumption of uniform density for the noise quantization is approximately valid? How does this result relate with figure 3.4?

1. Give the number of quantization bits and the corresponding SNR value at which you start to perceive the distortion. Give the number of bits and the corresponding SNR value at which you would say that the distortion is unacceptable.

1. From Figs. 3.8 and 3.9, what happens to the low amplitude samples of x[n]? And to the high amplitude values? What happens to the quantization error in either case?
2. From the observation of Figures 3.10 and 3.11, could it be said that for a given Nbits the μ-law quantizer approximately yields the same SNRseg for both the low and high power speech signals? And the uniform quantizer? Why?
3. Describe in general terms how the histogram of the quantization noise changes when the signal power increases. More specifically, how do the dynamic range and the power of the noise change? Is the behavior different for the uniform and μ-law quantizers? Why?
4. Experiment with different number of bits (Nbits) from Nbits=8 downwards. Give the number of quantization bits and the corresponding PSNR value at which you start to perceive the distortion (false contours). Give the number of bits and the corresponding PSNR value at which you would say that the distortion is inacceptable.
5. Which of the gradient bars get affected in each green and blue quantization? Why? Why do seem the bars to be more affected under the green quantization than under the blue quantization? (Hint: take into account your answer to the questions 6 and 7 of the previous study).