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

1. Obtain the discrete frequency of sinusoids in both images and relate them to the frequencies obtained in your answer to question 2 of the previous study. Could you describe the difference you observe between figures 3.1 and 3.2?
2. What frequency components does the decimated image preserve? Which frequency components are lost?
3. Can you see the aliasing in the decimated image (left)? Where is it located in the image? Observe the pants of the girl in the image. Based on the conclusions drawn in question 1 with the test image, can you interpret why the direction of the stripes on the pants have changed?
4. From the DFT representation (compare Figures 3.8 and 3.10), what are the main differences between using or not the anti-aliasing filter? Which frequencies get more affected?
5. How does the DFT of the zero-filled version relate to the DFT of the original image?
6. Observing the figures and your answer to the question 4 of the previous study, what are the advantages of using the “bilinear” interpolation filter instead of the “nearest neighbor”?
7. What parts of the original image correspond to the histogram peak centered at gray level 0.4? To answer this question, you are recommended to binarize the original image using different thresholds and compare the resulting images.
8. Is there any threshold value that allows a correct binarization of the original image? If the answer is negative, explain why the original image cannot be binarized correctly. You are suggested to inspect how the gray level of rice grains and background changes as the data cursor is moved across the image.
9. Select the threshold value that binarizes correctly the original image. Use the histogram in Fig. 3.24 as a guideline. A good binarization should provide an image in which pixels of rice grains are white, and the rest of pixels black.
10. Compare the histogram of y[m,n] in Fig. 3.24 with that of the original image x[m,n] in Fig. 3.18. What did it happen to the pixels that contributed to the disappeared central peak of Fig. 3.18?

1. Process again the original image x[m,n] using a shorter filter hi[m,n]. Consider that L=15 and select the best possible binarization threshold. Compare the result with the one obtained in question 9.