

# Aplicaciones de Teoría de la Información en Procesamiento de Imágenes

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# Course outline

- Review of information theory, data models, lossless coding
- Model estimation, fundamental limits, model cost
- Issues in image data modeling
- Applications in lossless image compression: the LOCO-I algorithm and the JPEG-LS lossless and near-lossless image compression standard
- Applications in image denoising: the iDUDE grayscale image denoising algorithm

lectures

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# Basic Bibliography

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- R. M. Gray and L. D. Davisson, Random Processes: A Mathematical Approach for Engineers. NJ: Prentice-Hall, Inc., 1986.
- J. Rissanen and G. G. Langdon, Jr., "Universal modeling and coding," IEEE Trans. Inform. Theory, **IT-27**, pp. 12–23, Jan. 1981.
- M.J. Weinberger, G. Seroussi, and G. Sapiro, "The LOCO-I lossless image compression algorithm: principles and standardization into JPEG-LS," IEEE Trans. Image Processing, **9**, No. 8, pp. 1309–1324, August 2000.
- B. Carpentieri, M. J. Weinberger, and G. Seroussi, "Lossless compression of continuous-tone images," Proceedings of the IEEE, **88**, pp. 1797–1809, Nov. 2000.
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- T. Weissman, E. Ordentlich, G. Seroussi, S. Verdú, and M.J. Weinberger, "Universal discrete denoising: known channel," IEEE Transactions on Information Theory, **51**, No. 1, pp. 5–28, January 2005.
- G. Motta, E. Ordentlich, I. Ramírez, G. Seroussi, and M. Weinberger, "The DUDE framework for continuous tone image denoising," IEEE Transactions on Image Processing, **20**, No. 1, pp. 1–21, January 2011.
- References highlighted in red describe the algorithms that will be studied in detail in the course