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Gabor T. Herman

# Geometry of Digital Spaces

Series: Applied and Numerical Harmonic Analysis

"La narraci6n literaria es la evocaci6n de las nostalgias. " ("Literary narration is the evocation of nostalgia. ") G. G. Marquez, interview in Puerta del Sol, VII, 4, 1996. A Personal Prehistory In 1972 I started cooperating with members of the Biodynamics Research Unit at the Mayo Clinic in Rochester, Minnesota, which was under the direction of Earl H. Wood. At that time, their ambitious (and eventually realized) dream was to build the Dynamic Spatial Reconstructor (DSR), a device capable of collecting data regarding the attenuation of X-rays through the human body fast enough for stop-action imaging the full extent of the beating heart inside the thorax. Such a device can be applied to study the dynamic processes of cardiopulmonary physiology, in a manner similar to the application of an ordinary cr (computerized tomography) scanner to observing stationary anatomy. The standard method of displaying the information produced by a cr scanner consists of showing two-dimensional images, corresponding to maps of the X-ray attenuation coefficient in slices through the body. (Since different tissue types attenuate X-rays differently, such maps provide a good visualization of what is in the body in those slices; bone - which attenuates X-rays a lot - appears white, air appears black, tumors typically appear less dark than the surrounding healthy tissue, etc. ) However, it seemed to me that this display mode would not be appropriate for the DSR.

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