



SIGNAL PROCESSING ISSUES IN DIFFRACTION AND HOLOGRAPHIC 3DTV (ThuAmOR12)

★ Author(s) :

Levent Onural
Haldun M. Ozaktas

(Bilkent University, Turkey)
(Bilkent University, Turkey)

★ Abstract :

Image capture and image display will most likely be decoupled in future 3DTV systems. For this reason, as well as the need to convert abstract representations to display driver signals, and the need to explicitly consider diffraction and propagation effects, it is expected that signal processing issues will play a fundamental role in achieving 3DTV operation. Since diffraction between two parallel planes is equivalent to a 2D linear shift-invariant system, various signal processing techniques play an important role. Diffraction between tilted planes can also be modeled as a relatively simple system, leading to efficient discrete computations. Two fundamental problems are digital computation of the optical field due to a 3D object, and finding the driver signals for a given optical device so as to generate the desired optical field in space. The discretization of optical signals leads to several interesting issues; for example, it is possible to violate the Nyquist rate while sampling, but still maintain full reconstruction. The fractional Fourier transform is another signal processing tool which finds application in optical wave propagation.