

AN OPTICAL TOMOGRAPHY SYSTEM USING A DIGITAL SIGNAL PROCESSOR

Abstract:

The use of a personal computer together with a Data Acquisition System (DAQ) as the processing tool in optical tomography systems has been the norm ever since the beginning of process tomography. However, advancements in silicon fabrication technology allow nowadays the fabrication of powerful Digital Signal Processors (DSP) at a reasonable cost. This allows this technology to be used in an optical tomography system since data acquisition and processing can be performed within the DSP. Thus, the dependency on a personal computer and a DAQ to sample and process the external signals can be reduced or even eliminated. The DSP system was customized to control the data acquisition process of 16×16 optical sensor array, arranged in parallel beam projection. The data collected was used to reconstruct the cross sectional image of the pipeline conveyor. For image display purposes, the reconstructed image was sent to a personal computer via serial communication. This allows the use of a laptop to display the tomogram image besides performing any other offline analysis. © 2008 by MDPI.