

Master 2011

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The investigation of Frequency Domain OCT in large range application.

ABSTRACT - Masterthesis

Optical coherence tomography (or OCT) is a technique for measuring the surface and the depth parameters of single or multilayer objects. The OCT can be operated in a time domain (TD OCT) or a frequency domain (FD OCT) mode.

Conventionally, the OCT is based on low coherence light sources and may measure short distances.

Current research has a goal to find a ways to extend the measurable range of OCT by selecting the sources with longer coherence length.

Usage of Fast Fourier Transformation algorithms extends the maximal measurable depth and reduces the time consumptions. It is achieved by extracting the depth information from a single image and neglecting the movable mechanical parts and motors. The research outlined that the FD OCT has a number of advantages in comparison with TD OCT. The experiments showed much better precision and accuracy of FD OCT comparing with the results gotten from TD OCT tests.

Research has outlined several methods for the maximal measurable range extension. They were tested and analysed.

The goal of range extension was achieved. However, the extension might be continued in terms of further development.

OCT is recognised as a highly promising technique for the surface measurement and it surely deserves the further investigation and promotion towards the final product fabrication.