

Comparing methods of FD-OCT signal processing via Computer Simulations

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Frequency Domain Optical Coherence Tomography (FD-OCT), a relatively new diagnoses tool based on low coherence interferometry. This technique uses a spectrometer which provides a spectrum as raw data that needs to be processed to be visually comprehensive and useful. Many types of processing are proposed, but in this study only three of them were implemented and compared to each other and with absolute values. The techniques used were: Direct Fourier Transform; Interpolation and Zero-Filling. To perform this study a software was developed in LabVIEW environment. This software simulated an ideal FD-OCT system, making possible to vary many parameters, such as the difference optical path or light source properties and the processing type itself. The results obtained between all the different configurations and signals processing were carefully analyzed. Parameters like processing cost, difference to the real value, peak width were evaluated. The analysis showed that the technique Zero-Filling $2N$ was, in an overall, the most suitable algorithm for the technologies available nowadays, when the analysis were weighted by costs of processing vs. benefits. Also was possible to identify an issue related with the direct interpolation and the position of spectrum concerning the center of the spectrometers CCD, resulting in a false structure.