A FAST METHOD OF PHASE RETRIEVAL FROM ZERO-MEAN SPECTRAL INTERFEROGRAM

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We present a fast method of phase retrival from spectral interferogram registered in a low coherence interferometric setup. The proposed approach is feasible for the class of spectral intefrerograms, which have zero-mean property, i.e. upper and lower envelopes bounding the signal are symmetrical with respect to zero at any wavelength. In addition, the signal needs to be smooth, however, both of the requirements can be easily fulfiled by proper signal processing available in real time operation during experimental data registration with a spectral detector. Phase φ(*λ*) is obtained from the aproximate relation:

$$\varphi'(\lambda)^2 \cong -\frac{I''(\lambda)}{I(\lambda)},$$

where *I*(*λ*) is the registered spectral interferogram, *I*''(*λ*) is a numerically calculated second spectral derivative of the signal *I*(*λ*) and φ'(*λ*) is the first spectral derivative of the phase.

Feasibility and limitations of the method are studied in dspersion measurements conducted for bulk materials (BK7) and optical fibers (SMF-28). Furthermore, we show the method accuracy for data including stationary phase point. Retrieved phase is compared to the results obtained by other methods known from literature.