Laser ultrasonic tomography of layered media with changes in acoustic impedance

Diploma thesis abstract.

The work is devoted to the numerical solution of the scattering theory inverse problem in case of the layered media. Ultrasound was employed for layered media investigation. Optoacoustic effect was used for the excitation of the wideband ultrasonic pulses.

The numerical procedure was developed for the reconstruction of acoustic impedance distribution in layered media with smooth inhomogeneities according to the backscattered ultrasonic pulse generated by laser radiation. A supergaussian filter was optimized for effective filtering of high frequency noise in deconvolution procedure.

The developed algorithm was applied to the reconstruction of acoustic impedance distribution in case of the layered media with both sharp and smooth changes in acoustic impedance. The experiments were performed with the phantom layered media and with biological tissues.