

## SIMULATION OF THE REFRACTOMETR BY MEANS OF THE SOFTWARE LABVIEW 6.1

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At creation of progressive high technology great demands by making uppers area of electronic technical materials is necessary to mark. In this connection for research of even surface of the date materials many methods are used. One of the methods that use is full inside returning method.

At present analyze of the used methods was shown that there is not considering between structure of even surface of the date materials and parameters of relearning beam and its problem has not been worked out. For investigation of characteristics of even surface of the electronic materials some relation have and the methods getting of it. There are betters and bed sides of every method.

The proffered method allows to get some information about attributes of even surface of the electronically materials at measuring optical parameters of relearning beams from the researched object. The principal scheme of the equipment is shown in the figure 1.

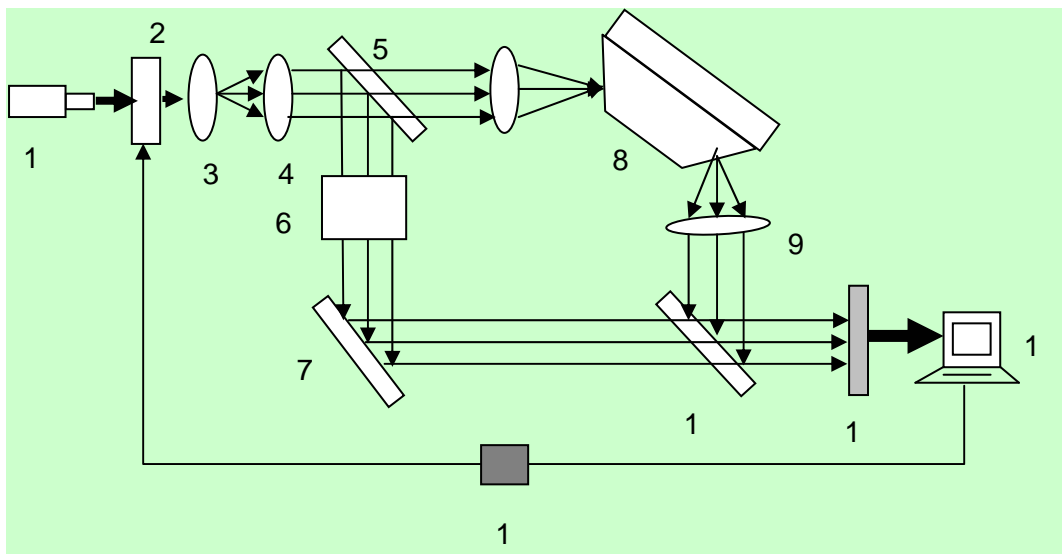


Fig. 1

The principal scheme of the refractometer includes the followings elements: 1 - beam, 2- optical transparent, 3 – collimator, 4,5,7,9,10 –optical system, 6- etalon area, 8- researching object, 11- photo-matrix, 12 –forcer, 13- personal computer.

The principal scheme of the equipment works as following: a light beam exiting from (1) beam source transmission (2) optical transparent enter to collimator (3). Beam which is devided in the collimator relocating through linz (4) parallel on half transparent surface (5). Beam relocating still etalon area (6) where it is reflecting in the looking glass (7) and returned beam after creation of interferential with its sinking on the photo matrix (11). Also by means of personal computer moment of reading information is defined. In this connection synchrony signal is given to optical transparent by the forcer.

By modification of the shown in figure 1 Max-sendel interferometer can do the same calculation for that unit.

In the refract meter researched work wave and coming through etalon area support wave are used.

$$E_s = E_{s0} \exp(j\omega t) \exp(j\Phi_s)$$

For support wave coming through etalon area:

$$E_r = E_{r0} \exp(j\omega t) \exp(j\Phi_r)$$

At two cases corehender and each of wave by the same time is directed to the photomatrix. Getting intensive of finale wave by union of these two waves is defined as following:

$$\dot{I} = (E_s + E_r)(E_s + E_r)^* = (\dot{I}_s + \dot{I}_r)(1 + \alpha \cos(\Phi_s - \Phi_r))$$

Where  $I_s$  and  $I_r$  are intenseness of work and support waves.  $\alpha$  corner is defined as:

$$\alpha = \frac{2E_{r0}E_{s0}}{E_{s0}^2 + E_{r0}^2}$$

If it is marking all over can say the following:

Wave intensive which sinking on photomatrix area is equally difference of phases of support and work waves coming through parallel sides of the refract meter. If intensive of each of two waves is great then modulation is maximal. Here modulation depth is marked as below:

$$\frac{\dot{I}_{\max} - \dot{I}_{\min}}{\dot{I}_{\max} + \dot{I}_{\min}} = \alpha$$

Quadrature at doing conditionally all pair harmonically is disappeared and it can write so simple:

$$\dot{I} = (\dot{I}_r + \dot{I}_s) \left\{ 1 + \alpha \left[ 2 \sum_{k=1}^{\infty} J_{2k-1}(\Phi_{s0}) \sin(2k-1)\Omega_s t \right] \right\}$$

Here if  $\Phi_{s0} \ll \pi$  is received, outside influence's values on the etalon area is received slowly then the expression is written so:

$$\dot{I} \approx (\dot{I}_r + \dot{I}_s) (1 + \alpha \Phi_{s0} \sin \Omega_s t)$$

In the proposed equipment LABVIEW 6.1 a model can be builder. So perimeters which include to the last expression can input from data control block. Executing option procedure of laser wave distance (from instrumental panel (w) for example), dumping corner (a) as theoretical by intensive of  $\dot{I}_1$  and passing through machete  $\dot{I}_2$  are inputted. The results are shown in the indication part of the instrumental panel (waveform graph) (Figure 2).

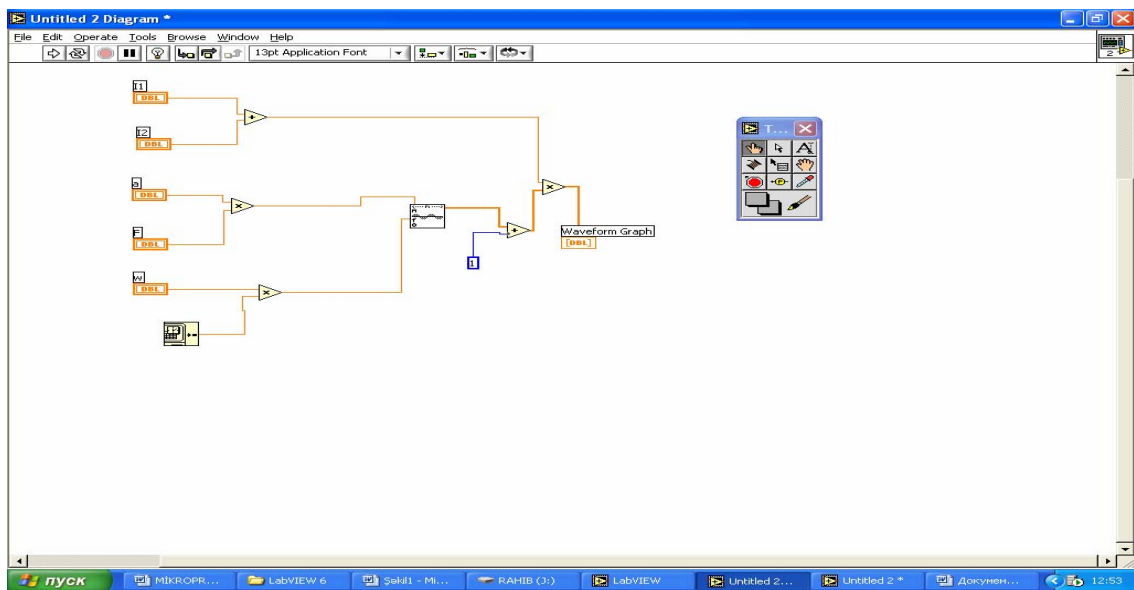
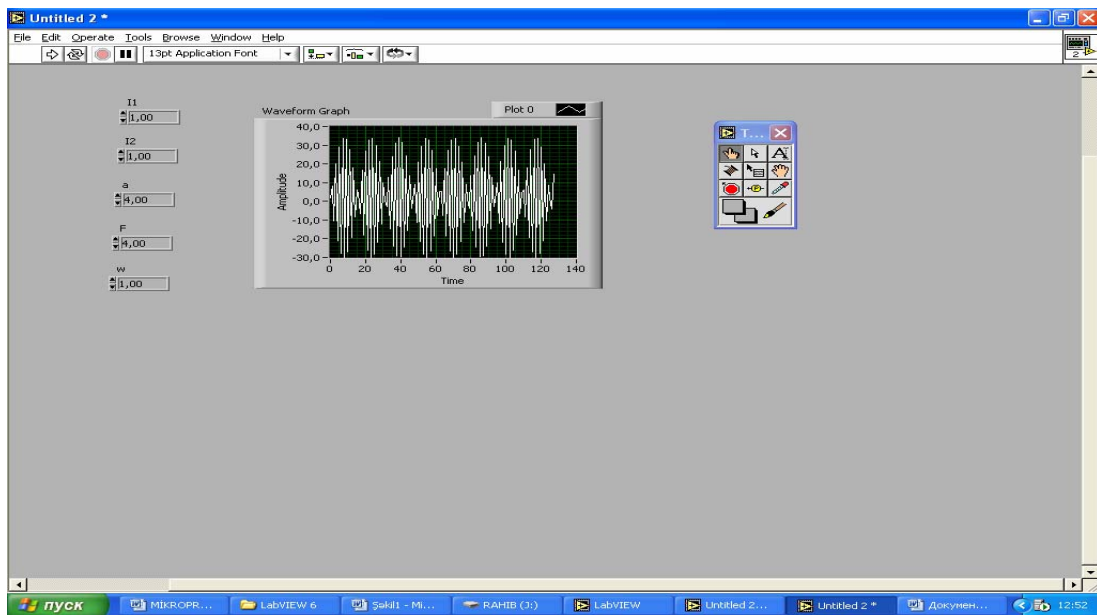


Fig. 2

### References

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