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FIBER OPTICAL SENSOR FOR LINEAR MEASUREMENTS

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Authors
I.O. Bragynets*, Yu.O. Masjurenko**
Institute of Electrodynamics National Academy of Sciences of Ukraine,
pr. Peremohy, 56, Kyiv, 03057, Ukraine,
e-mail: masjuriy@ied.org.ua
* ORCID ID : http://orcid.org/0000-0002-9528-5808
** ORCID ID : http://orcid.org/0000-0003-4209-1126

Abstract

A simple-designed sensor circuit for contactless stationary linear measurements with optical fibers as light guide is proposed. The scheme of the sensor allows doing constructively the sensor head from optical fiber in the form of a measuring probe. Its will provide an opportunity to carry out express control of the position of the controlled object in space. Taking into account the parameters of the optical elements of the proposed sensor, a lightenergy calculation of the optical circuit was performed. The signal-to-noise ratio at the photodetector output was estimated. A frequency-phase method for processing of an output photodetector signals when measuring the distance to the object being monitored and estimating its position in space was selected and substantiated for the proposed sensor circuit. Analytical modeling of conversion processes in the frequency-phase system was carried out. It's confirmed the possibility of measuring the air gap in the hydrogenerator between the rotor and the stator using the proposed fiber-optic sensor. References 15, figure 1.

Key words: laser, optical fiber, scattered light, diffuse reflection, linear frequency modulation, spectral analysis.

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