

FEASIBILITY OF DETECTING SOIL MOISTURE USING POROUS Al₂O₃ CLADDED Al₂O₃ WAVEGUIDE

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The response of porous Al₂O₃ cladded Al₂O₃ thin film optical waveguide to moisture laden soil overlay is reported in this paper. The soil packed in a plastic container was used as in-touch overlay on the claded waveguide and changes in the transmitted output due to moisture content variations has been investigated. The 45% moisture laden soil decreases the output considerably. An interesting observation being that the decrease is more than that obtained when the cladded waveguide is directly exposed to moisture.

Moisture and type of soil dependent response is observed. In the lower moisture range the cladded waveguide is quite sensitive to soil condition.

A NEW SCHEME OF AN ALL-OPTICAL J-K FLIPFLOP USING NON-LINEAR MATERIAL

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The role of memory devices in any communication and data processing system is very essential. So for optical computation and information processing the memory devices play also the significant role. Many proposed phenomenon are already seen where the optical memory devices are developed with the help of nonlinear material.

Here, in this communication the authors propose an implementation scheme for an All-optical J-K Flip-flop, which may serve a significant role in optical computation as well as in information processing. The advantages of this optical J-K Flip flop over its electronic counter part are also indicated. This Flip-flop may overcome the need of Master Slave Flip-flop under some special circumstances.

SCALE-INVARIANT ROAD SIGN RECOGNITION BY FOURIER PLANE SCALING OF SPECTRUM

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A new method is proposed for estimation of object size from the Fourier spectrum leading to scale-invariant pattern recognition. Instead of using the standard procedure of radial harmonic functions, the scaling factor is estimated from the Fourier spectrums of reference and test images. Since Fourier Transform of a two-dimensional object and its Fraunhofer diffraction pattern are identical, it is utilized to determine the scale factor. The test image is correlated with the reference image after rescaling its Fourier spectrum. Computer simulation results are presented for a reference object at several scaling versions as well as for some non-target objects.

Keywords: Optical correlators, Scale Invariant Recognition, Road sign identification.

SIMPLE LOW-COST TECHNIQUE FOR IN-SITU REFLECTIVITY MONITORING OF OPTICAL THIN-FILMS AND ITS APPLICATION IN LASER DIODE FACETS-COATING

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Laser diodes are by far the most varied, flexible, cheapest and the most abundant lasers. For long-term, reliable operation and for maximum optical power utilization, laser diode is coated with the anti-reflection (AR) and high-reflection (HR) coatings by means of dielectric layers on the front and the back facet, respectively. For the optimum performance, accurate monitoring and control over the reflectivity of the dielectric thin film layers at specific lasing wavelength is necessary. We have demonstrated a simple and inexpensive in-situ reflectivity measurement system for the facets-coating of laser diodes. The system relies on the measurement of dynamic optical reflectance of the growing thin film by means of intensity of a laser-beam reflected from the gallium arsenide test-substrate kept in the close vicinity of the laser diode facet being coated. The in-situ reflectivity monitoring of single layer AR film and multilayer HR films have been demonstrated and verified with ex-situ reflectivity measurements.

Key words: in-situ, reflectivity, laser diode, thin-film, facet-coating.

Short Communication

TEMPERATURE STABILISED LED AND LD DRIVE CIRCUITS

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The Light emitting diode (LED) and Laser Diode (LD) drive circuits for optical fiber communication transmission systems are very sensitive to the variations in temperature as forward current increases and diode junction voltage decreases leading to the poor spectral and circuit stability of the LED and LD drive circuits can be improved by designing the circuits for the two temperature ranges and the circuits analysed in these stability conditions. The performance of such circuits is better than any other design technique.

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