

JEMNÁ MECHANIKA A OPTIKA

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(J. Piřtora, M. Hrabovský).....203

Application of recursive algorithms for numerical evaluation of derivatives of Zernike polynomials (P. Novák).....208

The work deals with the problem of numerical evaluation of partial derivatives of Zernike polynomials with respect to Cartesian coordinates. Using existing recursive algorithms for evaluation of Zernike polynomials analogical recursive methods for calculation of their Cartesian partial derivatives are derived. Comparison of computational costs and numerical stability of proposed methods with respect to direct calculation using explicit relations is given on a basis of performed computer simulations.

Keywords: Zernike polynomials derivatives, recurrence relations, numerical methods, computer simulation

Software correction of mirrors misalignment in Cherenkov detector RICH-1 at COMPASS experiment at CERN

(L. Steiger, M. řulc).....211

One of the most important parts of Ring Imaging Cherenkov detector (RICH) is mirror wall. Cherenkov photons created inside the detector volume are focused by mirror wall towards detector plane. Two spheres of 116 multiple segments create the mirror wall. It is obvious that precise positioning of each individual segment affects overall performance of the RICH-1 detector. Photogrammetry technique for simultaneous alignment monitoring of mirror alignment is presented.

Keywords: Cherenkov radiation, mirror alignment

From technical library (I. Brezina)213

The effect of glass dispersion of the plane-parallel plate on lens image quality (A. Mikř, P. Pokorný).....214

The article discusses the influence of aberration of the plane-parallel plate inserted in front of the image plane of optical system, we analyze the effect of dispersion of the glass, from which the plane-parallel plate is made by, on the imaging properties in monochromatic and polychromatic light. It is also comprehensively addressed the issue of determining the optimal position of the image plane, the calculation of the spot diagram center, formulas for determining the change in transverse beam aberration, distortion and diameter of circle of confusion induced by glass dispersions.

Remembrance for RNDr. Věra Blumová, CSc. (A. Mikř) ..218

Automatized design of quasioptical filters at millimetre-wave frequencies in Matlab (S. Goňa, P. Tomářek, V. Křesálek) ..219

This article describes analysis of quasioptical filters by method of moments and their design with the aid of the local optimisation techniques in Matlab. Before performing the design by the local techniques, the necessary system parameters of the filter are derived from the given tolerance filter channel. These parameters include the order of the filter and the shape of the periodic filter element. The approach allows to automatize the filter design and frees the user from the details of the filter design theory. In the practical part of the paper, an example of the quasioptical stop-band filter for 76.5 GHz is being designed for the application to quasioptical frequency doublers.

Keywords: quasioptical filter, local optimisation techniques, planar periodic structures, method of moments

Comment to measurement of the beam profile

(M. Paúr, J. Podloucký)223

The article deals with some methods of laser beam measurement as described in the řSN EN ISO 11146. Attention is paid to the computational algorithm for calculation of basic parameters of the laser beam and its optimal modification. The results obtained by different methods are compared.

Keywords: laser beam, method of sliding edge, $D4\sigma$ method, quality factor

Message Transmission by Optical Channel with Turbo Equalization (K. Vlček).....226

Growing demands of multimedia telecommunication services enforce transmission speeds at 100 Gbit/s. The communication by optical fiber channel cannot be without nonlinearities at these speeds of transmission. The polarization and chromatic dispersion saddling can be observable. The mitigation of these effects helps the process of encoding of the messages by coded modulation, and concurrently equalization and decoding in the common calculation process in iterative method. The numerical solving methods of differential equations are based on wide offer of digital signal processing and enable applications of multilevel modulations. The method of equalization applied in receiver involves corresponding techniques of digital signal processing including digital filtrations. The aim of the paper is to describe and analyze improving of properties of communications on the physical level by turbo equalization.

30 Years from Invention of Flexible Video Endoscope

(M. Křížek)231

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ANOTACE

Kvazidistribuce v nelineární kvantové optice (J. Peřina)....204

Tento řlánek byl v rozřřené podobě prezentován 16. dubna 2013 na konferenci o optice a optoelektronice, pořádané mezinárodní společností pro optiku a fotoniku SPIE a nazvané Optics and Optoelectronics, Prague 2013, během slavnostního předání Ceny Galiea Galileiho Mezinárodní komise pro optiku ICO. Práce pojednává o kombinovaných optických parametrických procesech včetně jejich neklasických režimů a osvětluje je s pomocí vzájemných rozdělení fotonů a vzájemných vlnových kvazidistribucí.