

JEMNÁ MECHANIKA A OPTIKA

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OBSAH

Firma MICRO-EPSILON Czech Republic, spol. s r. o. slaví 20. výročí svého založení	71
Zářné vyhlídky pro Laser Optics Berlin	72
Experimentálne štúdium optických strát špeciálneho dvojjadrového mikroštruktúrneho optického vlákna (P. Stajanča, I. Bugár, J. Chovan, R. Buczyński, F. Uherek)	73
HANNOVER MESSE 2012	75
Klasická interpretace rozptylu elektromagnetické vlny na látkové částici pomocí jeho amplitudy a účinných průřezů (J. Pospíšil, K. Šafářová)	76
Metoda získání barevného kontrastu v prostorově-frekvenční oblasti spektra (A. Mikš, J. Novák, P. Novák)	81
Simulace vlivu chyb skenovacího systému pro 3D topografii povrchů (P. Novák)	86
Modulárne metamorfné robotické systémy a popis ich kinematiky (Z. Bobovský, F. Trebuňa)	92
Mezinárodní konference TAE 2013 na Technické fakultě ČZU v Praze (M. Libra)	94
Ing. Jan Kůr sedmdesátiletý	95
Z technické knihovny (J. Novák)	96

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CONTENTS

MICRO-EPSILON Czech Republic, spol. s r. o. commemorates 20th anniversary of its foundation	71
Glowing perspectives for Laser Optics Berlin	72
Experimental investigation of transmission loss in special dual-core microstructured optical fiber (P. Stajanča, I. Bugár, J. Chovan, R. Buczyński, F. Uherek)	73
HANNOVER MESSE 2012	75
Classical interpretation of the scattering of an electromagnetic wave on a material particle by means of its amplitude and effective cross sections (J. Pospíšil, K. Šafářová)	76
Color filtering of spatial frequency spectra (A. Mikš, J. Novák, P. Novák)	81
Simulation of the influence of the errors of scanning system for 3D surface topography measurements (P. Novák)	86
Modular metamorphic robotic systems and description of their kinematics (Z. Bobovský, F. Trebuňa)	92
Trends in Agricultural Engineering 2013 – 5th International Conference at the Faculty of Engineering, Czech University of Life Sciences, Prague (M. Libra)	94
Ing. Jan Kůr in his seventieth	95
From technical library (J. Novák).....	96

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CONTENTS

MICRO-EPSILON Czech Republic, spol. s r. o. commemorates 20th anniversary of its foundation..... 71

Glowing perspectives for Laser Optics Berlin..... 72

Experimental investigation of transmission loss in special dual-core microstructured optical fiber
(P. Stajanča, I. Bugár, J. Chovan, R. Buczyński, F. Uherek) 73

HANNOVER MESSE 2012..... 75

Classical interpretation of the scattering of an electromagnetic wave on a material particle by means of its amplitude and effective cross sections (J. Pospíšil, K. Šafářová) 76
The basic classical quantities and formulae, related to the linear scattering and absorption of a linearly polarized monofrequency electromagnetic wave on a dielectric material particle, are summarized and interpreted in the present article. The considerations refer mainly to the electrical component of this wave, to the relevant Maxwell's electromagnetic equations, established scattering amplitude and to the defined effective scattering and absorption cross sections. Simultaneously, the influence of the effective geometric cross section and the induced electric field inside the particle to the mentioned quantities are taken into account. The present text can be a starting point for the more complicated classical interpretation of the wave scattering and absorption in the many particles scattering media.

Color filtering of spatial frequency spectra
(A. Mikš, J. Novák, P. Novák) 81
The article is focused on the analysis of the technique for color filtering of spatial frequency spectra using color filters in the Fourier plane, where the spectra of investigated object are generated. That leads to a color change of corresponding structures in

the image. Equations are also derived for the primary (paraxial) design of basic parameters of the three-element zoom lens, which is necessary in case that we need to filter a wider range of spatial frequencies of the object.

Keywords: Fourier optics, optical filtering, zoom lenses

Simulation of the influence of the errors of scanning system for 3D surface topography measurements (P. Novák)..... 86
The work deals with the modeling and computer simulation of the influence of errors of three axis scanning system for surface topography measurements working in Cartesian coordinates. On an example of evaluation of spherical surfaces the influence of individual parameters on the accuracy of evaluated radius of tested spherical surface is presented.

Modular metamorphic robotic systems and description of their kinematics (Z. Bobovský, F. Trebuňa)..... 92
Kinematics of robotics devices of unchanging structure can be determined by two approaches, direct and inverse. The basis for both approaches is created in the design of robotic systems. By creating mathematical dependencies between different parts of robot, which are subsequently defined in the control algorithm. In the case of unchanging robot structures for this process to be performed once. Metamorphic modular robotic systems (MMRS) are able to change structure. With any change it is necessary to re-create a kinematic description of the newly created mechanism. For autonomous MMRS it is necessary to perform this conversion automatically when changing the structure. This article discusses the principle to describe the kinematics of MMRS modules.

Trends in Agricultural Engineering 2013 – 5th International Conference at the Faculty of Engineering, Czech University of Life Sciences, Prague (M. Libra) 94

Ing. Jan Kůr in his seventieth 95

From technical library (J. Novák)..... 96