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clásica de tal manera que la interpretación canónica de algunos admita las lecturas de "enunciado mal fundado", "enunciado verdadero", "enunciado falso", y, además, en alguno de los sistemas, se caracterice la definición de verdad aristotélica.

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PUBLICACIÓN NACIONAL

SIERRA ARISTIZÁBAL, Manuel
Libro: Argumentación deductiva.
En: Fondo Editorial Universidad EAFIT, Medellín, 256 p.
ISBN: 978-958-720-054-6, 2010.

Resumen
Este trabajo se encuentra orientado hacia la argumentación deductiva. Se enfatiza la presentación visual con diagramas, y se utilizan los árboles de forzamiento semántico como herramienta integradora de los aspectos deductivos, semánticos y argumentativos.

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GRUPO DE INVESTIGACIÓN EN ÓPTICA APLICADA

PUBLICACIÓN Y PONENCIA INTERNACIONAL

BETANCUR R., José Alejandro
HUD analysis using MAPLE
En: Proc. SPIE, Vol. 7688, 76880J (2010); doi:10.1117/12.849884. Online Publication Date: 5 May 2010. Head- and Helmet-Mounted Displays XV: Design and Applications Conference. Thursday 8 April 2010. Orlando, Florida.
ISSN: 0277-786X (print)
Datos de indexación: http://dx.doi.org/10.1117/12.849884.
Indexado: ISI WEB OF SCIENCE, SCOPUS, Metadex.
Clasificación C en Colciencias.

Abstract
This paper describes a Helmet Mounted display (HMD) based on an augmented reality system applied to car technologies, which is considered as a Head Up display (HUD), using the MAPLE software to analyze the system stability during specific environments in order to understand how the optic parameters are affected by the surrounding conditions. The objective of this paper is segmented into two parts, the first one is the recognition of many different optic parameters involved in such systems, which are analyzed using the mixing of a mathematical model and some measurement systems, where the principal idea was to describe the ratios between both aspects; and the second one is the comprehension of how all those parameters are related with the human perception; I found that parameters like FOV(Field Of View), eye relief and MTF (Modulation Transfer Function) are directly related with the image size, and contrast threshold, additionally I conclude that the effectiveness of the system is determinated by the optic elements used and the system array of lens, finally I found some lens structure that could reduce the aberration amounts present in this kind of systems; all these considerations are focused on the developing of a car gadget, but the application of this knowledge is unlimited in optic systems.

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PUBLICACIÓN Y PONENCIA INTERNACIONAL

SIERRA SOSA, Daniel Esteban; Ángel TORO, Luciano Alberto
Digital Optics Tool for Multi-Purpose Experimental Applications
En: The 3rd International Multi-conference on Engineering and Technological Innovation, Orlando-Florida, June 29th to July 2nd 2010. Proccedings, Vol II. ISBN: 978-1-936338-03-0 (print)

Versión digital:
http://www.iiis.org/CDs2010/CD2010SCI/OEPT_2010/index.asp?id=0&area=4

Abstract
This work presents the results concerning the application of a Discrete Fresnel Transform algorithm (DFT), which was upgraded for modeling and experimenting with scalar diffraction fields, whose characteristics are analyzed. The MATLAB® software environment was used to implement this algorithm, which allows the user to set the initial conditions, corresponding to the optical information at the input plane, by using a graphic friendly user interface (GUI). Then, by using the DFT algorithm, light propagation from the input to the output plane is achieved. The outputs of the algorithm are the maps corresponding to the 2-D distributions amplitude and phase-modulo 2ϖ, or equivalently, the corresponding real and imaginary parts of the complex analytical field. Also, to assist the analysis, line profiles for these maps are provided. Results allow the user synthesizing Fresnel diffraction in presence of multiple components, like lenses, prisms, diffractive gratings, and holographic elements. Indeed, by implementing a series of successive steps, applications like image forming and spatial filtering can be demonstrated. The basis of the algorithm's architecture and some typical results, which closely resemble those from the experiments, are presented.

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PONENCIA INTERNACIONAL

ÁNGEL TORO, Luciano Alberto; SIERRA SOSA, Daniel Esteban

Classical Diffraction Experiments for Digital Holography Algorithm Calibration

En: VII Reunión Iberoamericana de Óptica y X Encuentro Latinoamericano de Óptica, Láseres y Aplicaciones, Lima-Perú, 20-24 de septiembre, 2010.
Resúmenes ISBN: 978-612-4057-21-2. Versión digital:
http://www.pucp.edu.pe/conferencia/riao-optilas/index.html

Abstract
In digital holography, it is recorded an intensity pattern that is associated with the interference of two waves: the object beam and reference beam. This procedure allows storing the phase information of the object beam but coded in the interference pattern, which is an intensity pattern (hologram). In the reconstruction process, an image of the object is achieved by means of a digital operation that reproduces the light propagation through the hologram followed by the propagation through a distance in space. To do this, a discrete version of the Fresnel Transform (DFT) is implemented by using different numerical approaches. In our case, this was achieved by using the algorithm: "Two Dimensional Fast Fourier Transform (2D-FFT)" provided by MATLAB®, with a graphic user interface (GUI) for parameter settings and processing decisions. Among other, the list of the relevant physical parameters includes: wave length, pixel dimensions, number of pixels at the input and output, and propagation distance. To reconstruct the holographic image like in the experiment, the preceding parameters must be properly adjusted. This procedure is referred as the reconstruction system calibration. Several classical experiments, including near and far field diffraction, self-imaging by using both amplitude and phase gratings, Young interference fringes, and using lenses, were conducted for calibration purposes. A comparison between digital and experimental results, allowed us to set the calibration parameters. Typical results in our analysis are presented to demonstrate the procedure.

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PONENCIA INTERNACIONAL

ÁNGEL TORO, Luciano Alberto; SIERRA SOSA, Daniel Esteban

Speckle Fields Synthesis by Using the Discrete Fresnel Transform Algoritm

En: VII Reunión Iberoamericana de Óptica y X Encuentro Latinoamericano de Óptica, Láseres y Aplicaciones, Lima-Perú, 20-24 de septiembre, 2010. Resúmenes ISBN: 978-612-4057-21-2 (print). Versión digital: http://www.pucp.edu.pe/conferencia/riao-optilas/index.html

Abstract

This work presents the results concerning the application of a "Discrete Fresnel Transform" algorithm (DFT), conventionally used in digital holography, upgraded for synthesising and experimenting with speckle fields. Speckle fields can be generated both on the basis of "free-space propagation" and "image forming". The MATLAB® software environment was used to implement this algorithm, which allows setting the relevant parameters by using a graphic user interface (GUI). Among other parameters, the wave-length of the illuminating beam and the characteristics of the optical aperture (both for a free propagation and an imaging system) are chosen from the menu. In particular, multiple-apertures pupils can be used to generate modulated speckle fields and sub-speckle structures. Results are presented as intensity and modulo 2Pi-phase maps. As expected, the phase maps reveals the vortices networks, which acts as markers in metrological applications. The intensity and phase distributions on the respective maps are analysed, on the basis of their statistical properties. In particular, we studied the Gaussian nature of speckle, the average dimensions of the associated coherence patches, the internal modulation of speckles, and the vortex detection and location.

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Grupo de Óptica aplicada

PONENCIA INTERNACIONAL

ÁNGEL TORO, Luciano Alberto; SIERRA SOSA, Daniel Esteban

Understanding the Physical Optics Phenomena by Using a Digital Application for Light Propagation

En: VII Reunión Iberoamericana de Óptica y X Encuentro Latinoamericano de Óptica, Láseres y Aplicaciones, Lima-Perú, 20-24 de septiembre, 2010. Resúmenes ISBN: 978-612-4057-21-2. Versión digital en: http://www.pucp.edu.pe/conferencia/riao-optilas/index.html

Abstract

Understanding the light propagation on the basis of the Huygens-Fresnel principle stands for a fundamental factor for deeper comprehension of different physical optics related phenomena like diffraction, self-imaging, image formation, Fourier analysis and spatial filtering. This constitutes the physical approach of the Fourier optics whose principles and applications have been developed since the 1950's. Both for analytical and digital applications purposes, light propagation can be formulated in terms of the Fresnel Integral Transform. In this work, a digital optics application based on the implementation of the Discrete Fresnel Transform (DFT), and addressed to serve as a tool for applications in didactics of optics is presented. This tool allows, at a basic and intermediate learning level, exercising with the identification of basic phenomena, and observing changes associated with modifications of physical parameters. This is achieved by using a friendly graphic user interface (GUI). It also assists the user in the development of his capacity for abstracting and predicting the characteristics of more complicated phenomena. At an upper level of learning, the application could be used to favor a deeper comprehension of involved physics and models, and experimenting with new models and configurations. To achieve this, two characteristics of the didactic tool were taken into account when designing it. First, all physical operations, ranging from simple diffraction experiments to digital holography and interferometry, were developed on the basis of the more fundamental concept of light propagation. Second,

the algorithm was conceived to be easily upgradable due its modular architecture based in MATLAB® software environment. Typical results are presented and briefly discussed in connection with didactics of optics.

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GRUPO DE INVESTIGACIÓN EN SISTEMAS DE CONTROL DIGITAL

PUBLICACIÓN INTERNACIONAL

AGUDELO-TORO, Andres Y.; VÉLEZ, Carlos M.
Transition Management for the Smooth Flight of a Small Autonomous Helicopter.
In: Journal of Intelligent and Robotic Systems (publicado primero on-line)
(Online) http://www.springerlink.com/content/a700432347624252/
ISSN: 0921-029, 1573-0409
Datos de indexación: ISI WEB OF SCIENCE, SCOPUS, Base de datos: Compendex, Computer and InformationSystems Abstracts, Current Contents/Engineering, Computing and Technology, Electronics and Communications Abstracts, Engineering Index Monthly, Ergonomics Abstracts, Inspec, PsycINFO, Science Citation Index Expanded (SciSearch), Solid State and Superconductivity Abstracts, Zentralblatt Math.

Abstract
This work is centered in the definition of a transition management system for a small autonomous helicopter based on trajectory smoothing and a finite state machine (FSM). A smooth flight schedule decreases transients originated by direction changes and flight mode transitions (e.g., horizontal flight to hover mode). Although previous works have presented trajectory generation and FSM oriented controls, no previous studies have mixed these approaches in a single framework together with speed transitions. The proposed methods are validated in simulation with a realistic dynamic model of a small helicopter.

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PONENCIA INTERNACIONAL

FRANCO, José Luis; BETANCOURT, Alejandro; y VÉLEZ, Carlos Mario
Parameters identification of a Double Inverted Pendulum Using heuristic algorithms.
In: Congreso Internacional de Matemática Aplicada e Informática (ICAMI). ISBN 8789586708432. San Andrés, 2010

Abstract
In this work two heuristic algorithms, a genetic algorithm and simulated annealing, are used to identify the parameters of a double inverted pendulum, a nonlinear and unstable system of order six. The performance and parameter calibration of both heuristics are evaluated, and an analysis is made of the results of the identification.

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PONENCIA INTERNACIONAL

GIRALDO, Andrus; CONTRERAS, Luz Marina; y VÉLEZ, Carlos M.
Application of the Estimation Theory in the modeling of the transmission of nerve impulses in the axon of nerve cells.
In: Congreso Internacional de Matemática Aplicada e Informática (ICAMI). ISBN 8789586708432. San Andrés, 2010