ABSTRACTS

MEASURING OF YOUNG'S MODULUS OF THIN SAMPLES USING THE QUICK BENDING VIBRATIONS OF SEARLE'S PENDULUM

(pages 1-5)

Karol Kvetan
Slovak University of Technology, Faculty of Materials Science and Technology, Institute of Materials Science, Bottova 25, 917 24 Trnava, Slovak Republic, karol.kvetan@stuba.sk
Martin Bučány
Slovak University of Technology, Faculty of Materials Science and Technology, Institute of Materials Science, Bottova 25, 917 24 Trnava, Slovak Republic, xbucany@stuba.sk
Ondrej Bošák
Slovak University of Technology, Faculty of Materials Science and Technology, Institute of Materials Science, Bottova 25, 917 24 Trnava, Slovak Republic, ondrej.bošák@stuba.sk
Marián Kubliha
Slovak University of Technology, Faculty of Civil Engineering, Radlinského 11, 810 05 Bratislava, Slovak Republic, marian.kubliha@stuba.sk
Janette Kotianová
Slovak University of Technology, Faculty of Materials Science and Technology, Institute of Applied Informatics, Automation and Mechatronics, Bottova 25, 917 24 Trnava, Slovak Republic, janette.kotianova@stuba.sk

Keywords: Young's modulus, Searle's pendulum, quick bending vibrations, step procedure
Abstract: In this paper we present accurate measurements of elastic modulus of thin quick-vibrating wire samples by Searle´s pendulum. We provide detailed statistical analysis of measurement of one "non-traditional" sample - with a rectangular cross-section. In our paper we present the measurement of Young's modulus at quick-vibrating samples where vibrations are registered and analysed by electronic sensor or camera. Also, other necessary instruments (micrometre, calibre, weight) were on an electronic basis, which was a guarantee of high accuracy measurements. The degree of an accuracy being achieved was subjected by a detailed theoretical analysis, using knowledge of theory of the uncertainties.

MACHINE VISION INVESTIGATE THE TRAJECTORY OF THE MOTION HUMAN BODY- REVIEW OF THE METHODS

(pages 7-13)

Piotr Kuryło
University of Zielona Góra, Faculty of Mechanical Engineering, Institute of Machine Bulding and Exploatation, Zielona Gora, Poland, p.kurylo@ibem.uz.zgora.pl
Joanna Cyganiuk
University of Zielona Góra, Faculty of Mechanical Engineering, Institute of Machine Bulding and Exploatation, Zielona Gora, Poland, j.cyganiuk@ibem.uz.zgora.pl
Edward Tertel
University of Zielona Góra, Faculty of Mechanical Engineering, Institute of Machine Bulding and Exploatation, Zielona Gora, Poland, e.tertel@ibem.uz.zgora.pl
Peter Frankovský
Technical University of Košice, Department of Applied Mechanics and Mechatronics, Košice, Slovak Republic, peter.frankovsky@tuke.sk

Keywords: machine vision, rehabilitation, dedicated software, lighting

ABSTRACTS

Abstract: The paper presents the analysis of possible applications of vision appliances in the measurements of motion trajectory of a limb (or all body) mainly in rehabilitation exercises. The paper also presents the analysis of techniques of carrying out measurements of trajectories of particular limbs including issues concerning: correct lighting of the studied object, marker selection as well as selection of image recording appliences. The paper also discusses the basic components of the vision systems designed for the limb motion registering as well as possible applications of the systems in the object (patient) identification. Exemplary applications of the systems for measurement of a trajectory of upper limbs motion have been also presented. The paper also discusses extensively the SFRT system designed for measuring and recording the motion range in human joints as well as a method of recording the results of measurements with the use of the SFRT technique depending on the kind of a joint.

THE CONTROL OF HOLONOMIC SYSTEM

(pages 15-20)

Tomáš Lipták
Department of Mechatronics, Faculty of Mechanical Engineering, Technical University of Košice, Park Komenského 8, 042 00 Košice, Slovakia, e-mail: tomas.liptak@tuke.sk
Michal Kelemen
Department of Mechatronics, Faculty of Mechanical Engineering, Technical University of Košice, Park Komenského 8, 042 00 Košice, Slovakia, e-mail: michal.kelemen@tuke.sk
Alexander Gmiterko
Department of Mechatronics, Faculty of Mechanical Engineering, Technical University of Košice, Park Komenského 8, 042 00 Košice, Slovakia, e-mail: alexander.gmiterko@tuke.sk
Ivan Virgala
Department of Mechatronics, Faculty of Mechanical Engineering, Technical University of Košice, Park Komenského 8, 042 00 Košice, Slovakia, e-mail: ivan.virgala@tuke.sk
Darina Hroncová
Department of Mechatronics, Faculty of Mechanical Engineering, Technical University of Košice, Park Komenského 8, 042 00 Košice, Slovakia, e-mail: darina.hroncova@tuke.sk

Keywords: double inverted pendulum, Lagrange function, linearization, state space, PID regulator
Abstract: This paper deals with the issue of mathematical modelling of the double inverted pendulum. The paper consists of the determination of mathematical model created via Lagrangian, the linearization of system and the design of linear quadratic regulator. For linear stable system were chosen DC motors placed to joints. Further for these motors were set individual components of PID regulator. The last part of article deals with simulation of double inverted pendulum.

OPTIMAL CONTROL OF MANIPULATOR GRIP POSITION TO MOVE FLAT OBJECTS

(pages 21-25)

Andrej Ivanovich Abramov
Kalashnikov Izhevsk State Technical University, Department of Mechatronic Systems, Studencheskaya 7, 426069, Izhevsk, Russia, hitech1015@yandex.ru
Ivan Vasilevich Abramov
Kalashnikov Izhevsk State Technical University, Department of Mechatronic Systems, Studencheskaya 7, 426069, Izhevsk, Russia, abramov@istu.ru
Pavol Božek
Department of Control and Information Systems, Institute of Applied Informatics, Automation and Mechatronics, Faculty of Materials Science and Technology, Slovak University of Technology, 917 24 Trnava, Slovak Republic, pavol.bozek@stuba.sk
Timur Mazitov
Kalashnikov Izhevsk State Technical University, Department of Mechatronic Systems, Studencheskaya 7, 426069, Izhevsk, Russia, rymit1991@yandex.ru

ABSTRACTS

Alexey Palmov
Kalashnikov Izhevsk State Technical University, Department of Mechatronic Systems, Studencheskaya 7, 426069, Izhevsk, Russia, palmov-a@yandex.ru

Keywords: Contour, Moments, Hu Moments, Part Orientation, Flat Parts
Abstract: The methodology to explicitly define the flat object orientation in 2D space is proposed. A number of experiments with modelled data have been carried out, as a result, the developed methodology has been successful tested and importance of precise contour extraction of the object has been confirmed. The methodology obtained can be applied during the automation of processes of moving flat parts, sorting out of parts by shape and other similar operations.

THREE AXIS LINEAR PORTAL MANIPULATOR

(pages 27-30)

Milan Lörinc
VVU ZTS, a.s., Južná trieda 95, Kosice, Slovak Republic, milan.lorinc@ztsvvu.eu

Keywords: mechatronics, manipulator, actuator, sensor
Abstract: Three axis portal manipulator is nornally designed with four portal comception. This paper describes special type of three axis manipulator with only two portals. Designed manipulator are designed for educational purpose and practical training for students. RC servos are used as acutators for moving of all axis. Resistive sensors are used for sensing of movement in x, y axis.Rotary encoder is used for z axis movement sensing.