

50. Internationales Wissenschaftliches Kolloquium

September, 19-23, 2005

**Maschinenbau
von Makro bis Nano /
Mechanical Engineering
from Macro to Nano**

Proceedings

Fakultät für Maschinenbau /
Faculty of Mechanical Engineering

Startseite / Index:

<http://www.db-thueringen.de/servlets/DocumentServlet?id=15745>

Impressum

- Herausgeber: Der Rektor der Technischen Universität Ilmenau
Univ.-Prof. Dr. rer. nat. habil. Peter Scharff
- Redaktion: Referat Marketing und Studentische Angelegenheiten
Andrea Schneider
- Fakultät für Maschinenbau
Univ.-Prof. Dr.-Ing. habil. Peter Kurtz,
Univ.-Prof. Dipl.-Ing. Dr. med. (habil.) Hartmut Witte,
Univ.-Prof. Dr.-Ing. habil. Gerhard Linß,
Dr.-Ing. Beate Schlütter, Dipl.-Biol. Danja Voges,
Dipl.-Ing. Jörg Mämpel, Dipl.-Ing. Susanne Töpfer,
Dipl.-Ing. Silke Stauche
- Redaktionsschluss: 31. August 2005
(CD-Rom-Ausgabe)
- Technische Realisierung: Institut für Medientechnik an der TU Ilmenau
(CD-Rom-Ausgabe) Dipl.-Ing. Christian Weigel
Dipl.-Ing. Helge Drumm
Dipl.-Ing. Marco Albrecht
- Technische Realisierung: Universitätsbibliothek Ilmenau
(Online-Ausgabe) [ilmedia](#)
Postfach 10 05 65
98684 Ilmenau
- Verlag:  Verlag ISLE, Betriebsstätte des ISLE e.V.
Werner-von-Siemens-Str. 16
98693 Ilmenau

© Technische Universität Ilmenau (Thür.) 2005

Diese Publikationen und alle in ihr enthaltenen Beiträge und Abbildungen sind urheberrechtlich geschützt.

ISBN (Druckausgabe): 3-932633-98-9 (978-3-932633-98-0)
ISBN (CD-Rom-Ausgabe): 3-932633-99-7 (978-3-932633-99-7)

Startseite / Index:

<http://www.db-thueringen.de/servlets/DocumentServlet?id=15745>

V. Lysenko / K. Zimmermann / A. Ahranovich

Procedure for Optimized Technical Systems Design with the Morphological Interactive Invention Cube (MIIC) Usage

ABSTRACT

The paper presents the description of the synthesis process of new robots and their development. The method developed is based on the morphological box of Zwicky. The multidimensional interactive array, which is called a Morphological Interactive Invention Cube (MIIC), is used for the design and development of robots and similar technical systems. The subject of our work is the development of new functional principles for robots.

The described technique provides ideas for new solutions. It is possible to develop essentially new robots and technical systems. The developed interactive computer technique for robots design shows new opportunities in CAD.

PROCEDURE DESCRIPTION

Much attention is paid to support all design stages in modern computing systems for design and development except for the most fundamental one: the search of new principles in operation and idea generation [1]. Various methods of technical solutions are presented in literature which use software for engineering design support and technology selection.

CAD, CAM and similar systems usage does not necessarily provide a significant improvement of the quality of the product. However, the search for new ideas and new functional principles is one of the most essential stages of the design process. Therefore, CAD systems are of special value in this phase. Such computer systems can support the process of new ideas search. The Procedure for optimized technical systems design is presented.

The functions of robots can be realized in several essentially different ways. Developer awareness of all existing possible variants is limited. The usage of modern interactive software for the improvement of "man-computer" dialogue opens new opportunities for engineers [2, 3].

The process of selection of properties and parameters of robots visualization is proposed. A morphological method is used for the selection of the kinematics, principle of operation, and prototypes. An interactive computer image of a transparent Morphological Cube (MIIC) is used for properties of the robot selection and for subsequent analysis. The Cube is implemented using Macromedia Flash. By means of this interactive visualization a developer receives hundreds of new variants of robots and their prototypes for checking their technical feasibility and calculations.

Each one of these hundreds variants corresponds to several "information links" with description. Additionally, the usage of a client-server approach in Internet allows a completely automatically supported search for these variants. A special function generates the search string for different Internet resources according to selected variant. The Morphological Interactive Invention Cube with drop-down menu is presented on Fig. 1.

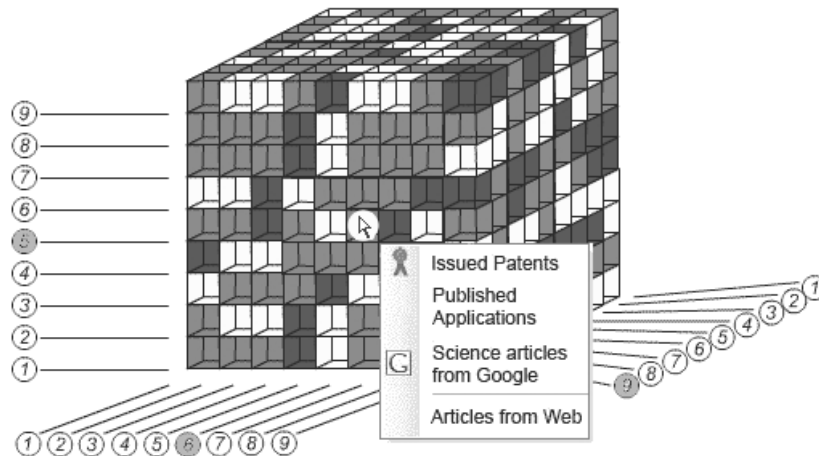


Fig. 1. Morphological Interactive Invention Cube

A user can choose useful functions for the synthesis of new robots. Having choused a function, a user gets some constructional variants of robots with different parameters' combinations. The computer allows creating essentially new robots with special, not yet known, characteristics. A process of a new class of robots creation will be presented to show opportunities of the method and MIIC application.

Literatur- bzw. Quellenhinweise:

- [1] Christopher Jones. Design methods. Seeds of Human Future. Mc Graw-Hill. New York. 1966
- [2] Lysenko V, Skuratovitch A., Zimmermann K. Maintenance of quality of productions at the design process.. International conference " Standardization and Quality management."2001. Minsk.
- [3] Lysenko V., Zimmermann K. New procedure for designing the optimised technical systems with use of the biological objects. DESIGN AND NATURE. Proceeding of 1 International Conference of Design and Nature. WITpress. 2002

Autorenangabe(n):

As.Prof., Dr-Ing. Victor Lysenko
 Belorussian national Technical University (Minsk)
 Prosp. F.Skariny 65. Minsk, 220027 Belarus,
 E-mail: victor_lysenko@mail.ru

Uni..prof. Dr,-ing. habil. Klaus Zimmermann
 Technical University Ilmenau
 Department of Mechanical engineering PF 100565
 D-98684 Ilmenau
 E-mail: klaus.zimmermann@tu-ilmenau.de

Post-graduate student Aliaksandr Ahranovich
 Belarussian State University of Informatics and Radioelectronics
 P.Brovki Str. 6, Minsk 220027 Belarus
 E-mail: mmts@bsuir.unibel.by