



CREATING A SET OF DIFFERENTIAL EQUATIONS TO PREDICT CHANGES OF VISUAL PERCEPTION OF DESIGN OBJECTS

Iryna KUZNETSOVA

Sevastopol national technical university, Ukraine

ABSTRACT The thesis is devoted to developing the prediction model for the cyclicity of design, decorative, applied and graphic art (DDAGA) objects visual perception. Based on synergetics and information theory, the quantity of details and information parameters are proposed for prognostic systems of differential equations. The reasoning is given for considering regional, technological, marketing, historical, and underlying surface factors. A system of differential equations is developed for predicting the cyclicity of perceiving elements in DDAGA objects, based on Solar activity (SA) and geofluctuations.

Keywords: qualitative and mathematical model; visual perception; object of design, decorative, applied and graphic arts

1. INTRODUCTION

To create a mathematical model of visual perception cyclicity of design, decorative, applied and graphic art (DDAGA) objects, a qualitative analysis was carried out. The qualitative analysis of DDAGA objects cyclicity prediction is made on the basis of SA. The asymmetry / symmetry cyclicity in DDAGA objects at different SA stages is investigated. The phase space is proposed as a basis for predicting the cyclicity of elements in DDAGA objects. Based on the visual-graphic interpretations of existing cultural cycle theories and considering the particulars of their authors' perception, a general theory of sociocultural dynamics is proposed.

2. INFORMATION

The phase space of perception cyclicity of art and design objects may be seen as placed within a trihedron formed by three axes: D , \dot{D} , and \dot{I} .

The researchers of the energy saving principle see in it, above all, the explanation of design features of an organism, its dimensions, forms, proportions, and parameter values. On the one hand, the optimum design principle is in itself, traditionally, a major focus of designers' work. On the other hand, it is important that the energy saving principle $E = \min$ (Fig. 1) is one of the basic principles of a human body.

Basing on the works by A. Kolmogorov, A. and Y. Sokolinykh, C. Shannon, G. Golitsyn, and others, we may note that the minimum potential energy E correlates with the maximum speed of information \dot{I} . This correlation is also shown on Fig. 1.

It is necessary to define what basic movements will occur in the proposed perception model. We know that solar spots are electric vortices, the essence of magnetism is reduced to rotation, and a rapid rotation

causes a charged electric body to produce a magnetic field. Thus, the formula for predicting style changes in design and art objects depending on the natural phenomena should include a trigonometric function, that is a torque. Proceeding from the definition, we obtain the sine or cosine function..

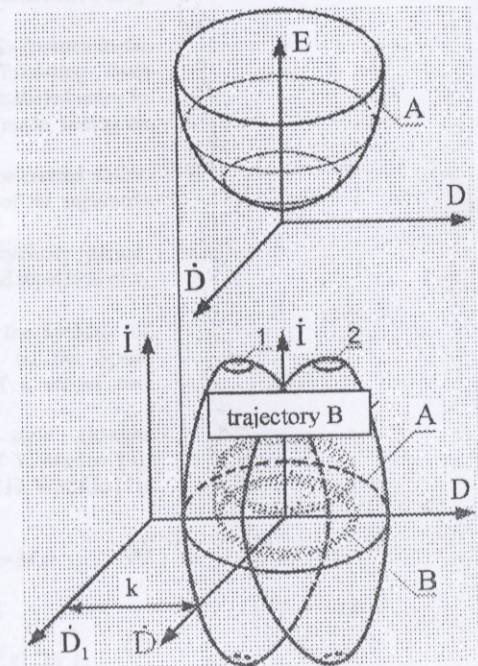


Fig. 1

The disturbing moment consists of restoring, decay (damping) moments, and the moment of inertia. Thus, the components may look as follows:

$$M_B + M_D + M_I = M_A. \quad (1)$$

The moment of inertia will consist of the permanent and periodic parts. The moment of inertia equals to:

$$M_I = f_1 \left(\frac{d^2 D}{dt^2} \right) \quad (2)$$

The restoring moment equals to:

$$M_B = f_2(D, t). \quad (3)$$

The damping moment equals to:

$$M_D = f_3 \left(\frac{dD}{dt} \right). \quad (4)$$

According to Kolmogorov [3], scientific information expressed in the text differs from the artistic information in its composition. The Kolmogorov entropy shows the speed of losing information about the condition of a system:

$$\frac{d^2 D}{dt^2} = f \left(D, \frac{dD}{dt} \right). \quad (5)$$

It has been known since the Poincaré's times that a singular point is a point where $\frac{d^2 D}{dt^2} = 0$ and $\frac{dD}{dt} = 0$ simultaneously, which provides a basis for the construction of separatrix surface.

To indicate the harmonicity of perception, the golden section (GS) is generally used. Among the papers discussing the phase space, E. Shuster's remark [9] about the character of separatrix surface being defined by the golden section deserves special attention. The potential ambiguity of image perception will be visually reflected in the projections (1, 2) of the separatrix surface on Fig. 1.

Basing on our previous researches we have to consider the following coefficients in deriving the formulae:

1) coefficients of the detail change formula:

Coefficient P defining the underlying surface influence.

Our earlier hypothesis concerning the national Ukrainian embroidery, as well as some other hypotheses assume that perception on the territory of Ukraine is subdivided according to the principle: steppe—foothills—mountains; the subdivision works not only in creating graphic objects, but also in the use of colors. Researches have shown that the more diverse is the underlying surface and the more broken the locality, the higher should be the coefficient of "the picturesque." Moreover, "the picturesque" component increase is added when the water surface is taken into consideration. The quantitative representation of these coefficients remains problematic for the time being, since the systematic research of the influence of the land or water surfaces for the Crimean region has only just started under the author's supervision. Thus, the total P_i coefficients should be taken into consideration.

It is expedient to introduce a separate coefficient R for regionality of perception. Our statistical research, undertaken under the influence of I. Ten's and F. Shmit's papers [3; 4] has shown that "the picturesque"

increases with the latitude toward the North of Ukraine. At this stage of research, the character of dependence in creating the formula may be assumed to be linear. However, this is a provisional assumption, which requires further elaboration. Statistical researches of the influences of low-frequency fluctuations (Solar activity—SA) on the human body have shown that the regional influence should necessarily be taken into account after every 1000 km (with the change of the rhythm phase).

Coefficient Tp defines technological progress. Its influence is estimated with the exponent $exp Tp$, proceeding from the general development tendency described by others authors.

2) Coefficients for the formula of information speed change:

Coefficient J , that defines the reduction of influence of the regional development history following the end of the influence term:

Besides, the ΣJ_i influence of the development history should be summed up, which agrees with the principles of the self-developing systems. The sum can also be included in the change of details formula.

Coefficient B characterizing the influence of the neighboring regions should also be regarded as the final coefficient B_i :

Coefficient M is determined by the economic and marketing factors. For high cost models of analog designing, coefficient M will be higher. For nonconventional modelling of these objects in high cost traditional analog designing (aircraft construction, shipbuilding, etc.), the influence of coefficient M may grow considerably.

Thus, the change of DDAGA object's features in the process of its creation has the following limit conditions: 1) region; 2) the date of predicted entry to the segmented market. Comparison is made, basing on the SA cyclicity.

True objects of arts or design shall be created within the boundary layer (on the boundary of the separatrix surface).

Well known is the approximate cyclicity period: repetition of τ_1 after about 11 years, and repetition of τ_2 after about 55 years. That is, $\tau_2 \approx 5 \tau_1$.

Ultimately a theoretical model of the cyclicity of DDAGA objects' perception based on the Space activity is proposed in the form of a set of two equations:

I. The rotary movement of style changes ("analytical"—"synthetic" in terms of Y. Maslov [4], or "linear"—"picturesque" in terms of H. Wöllflin [1]) is described by the formula:

$$I_n \left(\frac{d^2 D}{dt^2} \right) + A \left(\frac{dD}{dt} \right) + f_2(D, t) = M_A, \quad (6)$$

where M_A is the disturbing moment:

$$M_A = (F_G Z_G + F_{SA} Z_{SA}) \cos D + M_K \left(\frac{d^2 I}{dt^2} \right), \quad (7)$$

where F_{SA} is the force of Solar activity; it may be defined by Volf's numbers, and the prognosis curve may be built by the astronomers' prognosis curve; F_G is the force of geofluctuations (GF); a prognosis similar

to that proposed on the basis of Volf's numbers may be developed; M_K is the moment of unexpected influences in the Space.

The moment of inertia is defined as:

$$M_I = I_n \left(\frac{d^2 D}{dt^2} \right), \quad (8)$$

where I_n is the mass of all design objects multiplied by r .

The damping forces moment is calculated by the formula:

$$M_D = A \left(\frac{dD}{dt} \right). \quad (9)$$

The restoring moment

$$M_B = f_2(D, t) = Q \cdot \cos[\sigma_K t - \varepsilon(t)], \quad (10)$$

where Q is the volume of design and art objects V , multiplied by coefficient ρ . M_B also includes the arm of statistical stability as function of D : $l(D)$ is the arm of statistical stability, $\Delta l(D, t)$ is the harmoniously changing increase caused by SA and GF, σ_K is frequency, and $\varepsilon(t)$ is random phase. Thus,

$$M_B = Q \{ l(D) + \Delta l(D) \cos[\sigma_K t - \varepsilon(t)] \} \quad (11)$$

II. The longitudinal movement of information (the increase of its speed along the axis):

$$V \left(\frac{d^2 I}{dt^2} \right) = F_G + F_{SA} \quad (12)$$

where V is the volume of design and art objects.

As the quantity of details cannot be a negative value, the beginning of coordinates shifts by the value of K . Then:

$$D_1 = D + k. \quad (13)$$

The above summarizing yields:

$\exp T_p, R, \Sigma P_i$ are the coefficients of the rotary movement formula (6),

$\Sigma J_i, \Sigma B_i, M$ are the coefficients of the movement formula (12).

The resulting set of equations:

$$\left\{ \begin{aligned} & \left\{ \exp T_p R \Sigma P_i \left[I_n \left(\frac{d^2 D}{dt^2} \right) + A \left(\frac{dD}{dt} \right) + Q \{ l(D) + \right. \right. \\ & \left. \left. + \Delta l(D) \cos[\sigma_K t - \varepsilon(t)] \} \right] \right\} = \\ & = (F_G Z_G + F_{SA} Z_{SA}) \cos D + M_K \left(\frac{d^2 I}{dt^2} \right), \\ & \Sigma J_i \Sigma B_i M V \left(\frac{d^2 I}{dt^2} \right) = F_G + F_{SA}. \end{aligned} \right. \quad (14)$$

3. CONCLUSION

The mathematical model of predicting the cyclicity of DDAGA objects' perception has been created, based on synergy influenced by Space cyclicity (SA and GF). The model is "rigid" and requires further research oriented toward either its "loosening," or more precise definition of coefficients.

REFERENCES

- [1] Вельфлин Г. Основные понятия искусства. Проблема эволюции стиля в новом искусстве: Пер. с нем. - М. - Л.: АКАДЕМИА, 1930. - 289 с.
- [2] Голицин Г.А., Петров В.М. Информация - поведение - творчество. - М.: Наука, 1991. - 224 с.
- [3] Колмогоров А.Н. Три подхода к определению понятия «количество информации» // Проблемы передачи информации. - М.: Наука, 1965. - Вып. 1. Т.1. - С.3-11.
- [4] Маслов С.Ю. Симметрия познавательных механизмов и ее следствия // Семиотика и информатика. - М.: ВИНТИ, 1983. - Вып. 20. - С.3-31.
- [5] Соколов А.А., Соколов Я.А. Математические закономерности электрических колебаний мозга (Материалы первых Лазаревских чтений). - М.: Наука, Гл. ред. восточной литературы, 1976. - 97 с.
- [6] Тэн И. Лекции об искусстве (Философия искусства). Третья часть. Живопись в Нидерландах. - М.: Изд-во Всероссийского Центрального Исполнительного Комитета Советов Р., С., К. и К. Депутатов, 1919. - 124 с.
- [7] Шеннон К. Работы по теории информации и кибернетике. - М.: Иностранная литература, 1963. - 412 с.
- [8] Шмит Ф.И. Искусство - его психология, его стилистика, его эволюция. - Харьков: Союз, 1919. - 328 с.
- [9] Шустер Э. Детерминированный хаос. - М.: Мир, 1988. - 240 с.

ABOUT THE AUTHORS

Kuznetsova Iryna, Cand.Sc., Sevastopol national technical university, Department of Descriptive Geometry and Graphics in Sevastopol, Ukraine. Her research interests is cyclicity of perceiving elements in design, decorative, applied and graphic art objects. She can be reached by e-mail: iakuz@lik-info.com or through postal address: App.11/7, Nadegda Ostrovskaja str./ Sevastopol 99028, the Krimea, Ukraine

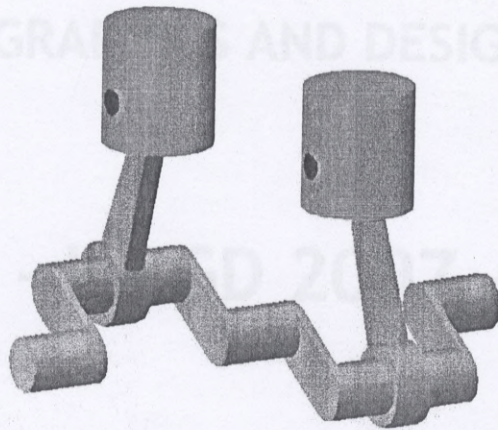


Dunarea de Jos University
Galati - ROMANIA

PROCEEDINGS



of the
**2nd INTERNATIONAL CONFERENCE
on Engineering Graphics and Design
June 7-10 2007 Galati - ROMANIA**



GALAȚI 2007



"Dunarea de Jos" University, Galati
Graphics, Mechanisms and Tolerances Department

THE 2nd INTERNATIONAL CONFERENCE ON ENGINEERING GRAPHICS AND DESIGN
- ICEGD, 2007 -

June 7 - 10, 2007, Galati, ROMANIA

PROCEEDINGS

ON THE 2nd INTERNATIONAL CONFERENCE ON ENGINEERING GRAPHICS AND DESIGN

- ICEGD 2007 -

I.15	HARAGA Georgeta Considerations concerning perspective	69
I.16	MARIN Dumitru The intersection of cylindrical surfaces grafo-analytical studies	73
I.17	MÂRZA Carmen Study concerning the infinite branches to the intersection of the second order curved	77
I.18	OPREA Gabriel Wave reflection on paraboloidal surfaces – a descriptive geometry approach	81
I.19	OPREA Gabriel Wave reflection on conoidal surfaces – a descriptive geometry approach	85
I.20	ORBAN Magdalena On the generation and applications of enveloping surfaces	89
I.21	ORBAN Magdalena On the use of descriptive geometry for construction and interpretation of ternary equilibrium diagrams	93
I.22	PETRE Ivona, MĂNESCU Maria, POPA Carmen Planer section in a circular and oblique con having two linens	97
I.23	POPA Carmen, MĂNESCU Maria, PETRE Ivona Sphere-oblique circular cylinder intersection in a given conditions	99
I.24	POPA Carmen, PETRE Ivona, MANESCU Maria Vectorial method to determinate cylinders unfoldings	101
I.25	TARAS Iryna Singularities of discrete interpolation of curves for creation of borehole model	103
I.26	KUZNETSOVA Iryna Creating a set of differential equations to predict changes of visual perception of design objects	106
I.27	TOCARIU Liliana Stages in the study of cylindroid surfaces	109
I.28	URSU-FISCHER Nicolae Contribution to the study of the cams profile used in radial piston multistroke hydraulic motors	113

CONTENTS

Section I - THEORETICAL GEOMETRY AND GRAPHICS

I.01	ALDEA Sorin Some considerations on the definition of torus and on the sections within the torus	15
I.02	ALDEA Sorin Sections through the torus parallel with the direction of the bi-tangential planes	19
I.03	BAROIU Nicușor, ȘOLEA Liviu Cătălin The use of level planes to obtain cross-sections through geometric and relief forms	23
I.04	BĂLCĂU Monica, BODEA Sanda The construction of particular planes by comparative methods	27
I.05	BODEA Sanda, CRIȘAN Nour – I., BĂLCĂU Monica Extended about the construction of the plan	31
I.06	BUDIȘAN Tiberiu, CRIȘAN Nour The tractrix and their surfaces	33
I.07	BUDIȘAN Tiberiu Catenoids and helicoids	37
I.08	DĂNĂILĂ Vanda – Ligia Dimensioning of the development drawings	41
I.09	DOBRE Daniel Applications of inversion transform to the curves – diagrams Loci theory	45
I.10	DRĂGAN Delia, BĂRBÎNȚĂ Dorin Study on the representation of the Plücker conoid	49
I.11	DUCA Mioara, POPESCU Narcisa, DUCA Iulian Conical surfaces. AutoCAD study and possible mathematical relations ...	53
I.12	DUMITRU Constantin, DUMITRU Violeta Cristina Probabilistic model for the automatic generation of aesthetic measure vectors	57
I.13	GHEORGHIU Monica, CHELCEA Mirela Proposal for changing some notations and designations of geometrical elements used in descriptive geometry	61
I.14	GHEORGHIU Monica, CHELCEA Mirela The use of the theorems of the geometry in the plane and space for the tracing of the projections of the geometric elements in double and treble orthogonal projection	65

Section II - APPLIED GEOMETRY AND GRAPHICS

II.01	BAICU Ioan, OANCEA Nicolae A graphic method for determination of gearing line	117
II.02	BAICU Ioan, ABRUDAN Ovidiu Graphic variant for the pattern of surfaces engendering - graphic pattern-making of surfaces engendering in winding, associated to rolling axoids	121
II.03	BATOG Ionel A modular parametric approach in modeling spiral elevators body	125
II.04	BELEA Gheorghe Comments on the construction drawing standards	129
II.05	BOCIOACĂ Radu, NĂSTASE Alexandru Modele de calcul pentru mecanismul spațial conținând cupla superioară dreaptă - dreaptă	133
II.06	BOLOȘ Codruța, BÂRSAN Lucian, BUCUR Bogdan Aspects regarding the structure of graduation papers in industrial design	137
II.07	BUCUR Bogdan, BOLOȘ Codruța Computer aided reconstruction of damaged maps	141
II.08	CRIȘAN Nour -I., BODEA Sanda, BUDIȘAN Tiberiu Industrial design and modern education	143
II.09	GHEORGHIU Monica, CHELCEA Mirela Famous buildings as models for ruled surfaces	147
II.10	GHIOLȚEAN Lucia-Margareta Stereographic projection applied in cartography	151
II.11	IONIȚĂ Stela, HOPU Cristina The utilization of transformation methods for the representation of the unfolded surfaces. the automated drawing of unfolded surfaces	155
II.12	MARIN Dumitru From the geometric shape to the technological shape in industrial design	159
II.13	MOLDOVEAN Gheorghe, HUIDAN Livia, COMAN Alin Profile modification influence on the tooth addendum extension of internal gear	163
II.14	MOURÃO António, MATULEA Iordan, GONÇALVES-COELHO António Consistent tolerancing through the distinct design domains to improve the quality of mechanical products	167

II.15	OLARIU Felicia, MĂRZA Carmen Analysis of means of covering surfaces in architecture	171
II.16	PETRE Ivona, POPA Carmen, MĂNESCU Maria Applications of descriptive geometry in technical design	175
II.17	RAICU Lucian Light and colour in design	177
II.18	RAICU Lucian Product aesthetic factors	181
II.19	SAFTENCU Doina Diagrams for compliant mechanisms	185
II.20	SIMION Ionel, SIMION Andreea Geometric product specification	189
II.21	STACHEL Hellmuth The geometry behind the numerical reconstruction of two photos	193
II.22	STĂNILĂ Aneta, HÎNCU Grațiela The use of color in industrial design	197
II.23	TOCARIU Liliana Competitiveness through quality in industrial design	201
II.24	TOCARIU Liliana The present concept of modernity in industrial design	205
II.25	ȚAPU Ermina, ȚAPU Ruxandra, MOCANU Bogdan Projecting the shape using the genetic algorithms	209
II.26	ȚAPU Ermina Representation of blending surface in nurbs surface	213
II.27	ȚĂLU Ștefan, ȚĂLU Simona-Delia, SHAH Harshad, ȚĂLU Mihai A new mathematical spherical model in the human corneal modelling ..	217
II.28	ȚĂLU Ștefan, ȚĂLU Simona-Delia, SHAH Harshad, ȚĂLU Mihai A new approximation of corneal surface using ellipsoidal surfaces	221
II.29	URSU-FISCHER Nicolae 3D representation for the free vibratory movements of shafts	225
II.30	VELICU Doru, MOLDOVEAN Gheorghe Profile modification influence on the contact ratio for straight bevel gear	229
II.31	VELICU Radu, VELICU Doru Optimization criteria and structural synthesis of two-planetary group transmissions	233

Section III - ENGINEERING COMPUTER GRAPHICS

III.01	ANDREI Laurenția, ANDREI Gabriel Tooth contact analysis in case of curved face width spur gears	237
III.02	ANGHEL Alina, ANTONESCU Ion, BARAN Marius Building an expert system for automatically choose of tolerances and fit in cad systems	241
III.03	BÂRSAN Lucian, BÂRSAN Anca, BOLOȘ Codruța Design for disassembly as an essential step in fulfilling the ecodesign goals: reuse, repair, re-manufacture, recycle.....	245
III.04	BOLOȘ Codruța, OLARU Adrian, OLARU Lorena Corel Studio - set of multimedia tutorials	249
III.05	DIMA Mircea, OANCEA Nicolae Model for the graphical determination of the roughness surfaces.....	253
III.06	DOBRE Daniel Computer aided design of elastic coupling with metallic membranes using solid modelling	255
III.07	DUMITRU Constantin, DUMITRU Violeta Cristina Standpoints regarding the problem of form aided design	259
III.08	GAVRILĂ Cornel Cătălin A mobile coupling virtual modelling, using ADAMS	263
III.09	GHEORGHE Dumitru, MORĂRESCU Ana, BAICU Ioan, BAROIU Nicușor, GEORGESCU Constantin, ȘOLEA Liviu Accuracy-an essential factor in increasing clutch quality.....	267
III.10	GHEORGHE Dumitru, BAROIU Nicușor, GEORGESCU Constantin, BERBINSCHI Silviu, GHEORGHE Sorin Aspecte ale optimizării proiectării cercetării experimentale	270
III.11	GOANȚĂ Adrian Mihai Geometric 3D modeling of a mouse using cutting surfaces	273
III.12	GOANȚĂ Adrian Mihai Performance of some tools provided by the Mechanical Desktop 6	277
III.13	GOANȚĂ Adrian Mihai 3D Info-graph results in designing hydraulic elements	281
III.14	GORANOV, Petar, STOEV, Atanas A new modelling interface for assembly constraints specification	285
III.15	HARAGA, Georgeta Modeling in draft and part modules with the solid edge soft	289
III.16	IONIȚĂ Elena Creating 3D parts using CATIA V5 application	293

III.17	IONIȚĂ Elena	Computer aided design of cylindrical worm gears	297
III.18	MEREUȚĂ Elena, VEREȘIU Silvia, RUS Mădălina	On the topology of mechanisms designed for curves generation	301
III.19	MEREUȚĂ Elena, RUS Mădălina, VEREȘIU Silvia	Curvature centers in mechanisms	305
III.20	MORĂRESCU Ana	Algorithm for generating the profiles of the rooth compressors rotors ...	309
III.21	MORĂRESCU Ana	Modeling of a helical pump propulsion system	313
III.22	NENORTA Vidmantas, PUODZIUNIENE Nomeda, PILKAITE Tilmute	Reconstruction of AutoCAD drawings, models to 3d parametrical parts	317
III.23	OANCEA Nicolae, CUCU Marian, TEODOR Virgil	Tangents method for graphical representation of a rotary cutter profile .	321
III.24	ORĂNESCU Amedeu, VEREȘIU Sivia, RUS Mădălina	Geometrical and analytical laws of composition in mechanisms. correlation and disjunction	325
III.25	PALAGHIAN Liviu, BUCȘĂ THOMPSON Mioara	Worm gear surfaces and heat transfer through	329
III.26	PASCU Nicoleta-Elisabeta, ADIR Victor	Shape and color into cad graphic communication	333
III.27	POPA Camelia	The influence of rotor deflection upon screw compressor performance .	337
III.28	POPA Camelia	CFD analysis of screw compressor performance	341
III.29	POPA Camelia	Tooth contact analysis for hypoid and spiral bevel gears	345
III.30	POPA Dragoș, GHERGHINA George, BOGDAN Mihaela Liana	About the virtual simulation of the human knee joint	349
III.31	PRUNĂ Liviu, SLONOVOSCHI Andrei, ANTONESCU Ion	Paraboloid of revolution as solid model	353
III.32	RACOCEA Cristina	AutoCAD electrical tools	357
III.33	ROMANESCU Camelia, PRUNĂ Liviu, SLONOVOSCHI Andrei	Expert systems methodology	361
III.34	RUS Mădălina, MEREUȚĂ Elena, VEREȘIU Sivia	The drawing of the plane curves by means of the CAD – Solid Edge ...	365

III.35	RUS Mădălina, VEREȘIU Sivia, MEREUȚĂ Elena The designing of some flange series by means of the Solid Edge	369
III.36	RUSE Gheorghe Modellierungsstrategie einer zusammenbaugruppe mit dem programm CATIA V5	373
III.37	RUSE Gheorghe, OPREA Gabriel Erzeugen einer produktmodells mit dem programm CATIA V5	377
III.38	RUSE Gheorghe, OPREA Gabriel Rechnereinsatz in den konstruktionsphasen	381
III.39	RUSE Gheorghe Betrachtung ueber die geometrische modellierung eines einschaliges rotationshyperboloid	385
III.40	SAFTENCU, Doina Masks' graphics in MATLAB/SIMULINK	389
III.41	SIMION Ionel, SIMION Andreea Constraint geometry	393
III.42	ȘOLEA Liviu Cătălin, ȘOLEA Dumitru, BAROIU Nicușor The evaluation of assets belonging to the historical - cultural and national patrimony, taking in to consideration some esthetics principles, category and notions	397
III.43	URDEA Mihaela Designing a rubber band layout using a height-level application	401
III.44	VASILESCU Ileana – Adriana Solids simulation technique	405
III.45	VEREȘIU Silvia, RUS Mădălina, MEREUȚĂ Elena Aspects concerning the movement of the mobile mechanical structures with imposed kinematic	409
III.46	VEREȘIU Silvia, MEREUȚĂ Elena, RUS Mădălina The design of the gears having parameters, using Solid Edge.....	413

Section IV - GRAPHICS EDUCATION

IV.01	ABRUDAN Ovidiu, BERBINSCHI Silviu Considerations With Regard To Screw Thread and Threaded Joint Representation in AutoCAD	417
IV.02	ABRUDAN Ovidiu, BERBINSCHI Silviu Teaching Aids – Continuity	421
IV.03	ADIR Victor, PASCU Nicoleta-Elisabeta Graphic education as teaching method concerning the representation of pieces as views and sectional views	425

IV.04	ANDO Naomi, SHIBATA Akihiro, YAMAHATA Nobuhiro Design by lines - study on an educational method for architectural form generation	429
IV.05	BĂRBÎNȚĂ Dorin, DARDAI Radu, DRĂGAN Delia Study concerning the development of the spatial perception of the undergraduates	433
IV.06	CONSTANTINESCU Vasile Nicolae Visualization-simulation program for reciprocating engine kinematics, four stroke cycle	437
IV.07	CONSTANTINESCU Vasile Nicolae Visualization-simulation program for piston engine dynamics, four stroke cycle	441
IV.08	CRĂCIUN Florina-Maria The importance of illustration in written documents	445
IV.09	CRĂCIUN Florina-Maria The role of symbol in increasing creativity	449
IV.10	DOLGA Lia, FILIPESCU Hannelore User-defined content in a modern learning environment for engineering graphics	453
IV.11	DRĂGAN Florin LINUX based remote access communication, data base and assesment server, using apache web server, PHP and MySQL.....	457
IV.12	DRĂGULĂNESCU Elena, MĂRGINEAN Liviu Ștefan The purposes of higher education and extramural education and graphics like a possibility in this way	461
IV.13	DRĂGULĂNESCU Elena, MĂRGINEAN Liviu Ștefan The purposes of primary education in the democratic education, generally and by graphics	465
IV.14	DUICU Simona Sofia Graphic identity and the structure of the group	469
IV.15	DUICU Simona Sofia Study case - how to use geometric psychology	473
IV.16	GHERGHINA George, POPA Dragoș, BOGDAN Mihaela, GLUGĂ Cristian About modern technical graphics using in the virtual prototyping	477
IV.17	HÎNCU Grațiela, STĂNILĂ Aneta On teaching descriptive geometry at the faculty of civil engineering of Iași	481

IV.18	IONIȚĂ Stela, IONIȚĂ Georgiana Adina Theoretical concepts of the didactic evaluation	485
IV.19	IORDACHE Doina Conception de produits et interdisciplinarité design – analyse de la valeur – environnement	489
IV.20	MATULEA Iordan, NĂSTASE Alexandru Grafica animată, instrument didactic în studiul cinematic al sistemelor mecanice	493
IV.21	PETRESCU Ligia Graphical communications	497
IV.22	PETRESCU Ligia Graphical educations in the present context	501
IV.23	PIEKARSKI Maciej E-learning - real possibility of rationalization the didactics of the descriptive geometry	505
	AUTHOR INDEX.....	509

graphical design (GD) process, a qualitative study was carried out. The qualitative analysis of GDGA is shown visually prediction is made on the basis of SA. The asymmetry / symmetry analysis in GDGA is shown at different SA stages investigated. The phase space is presented as a basis for predicting the quality of elements in GDGA design. Based on the visual graphic interpretations of existing virtual world models and considering the particular of their subject, proposing a general theory of conceptual systems is prepared.

1. INTRODUCTION

The phase space of reception velocity of set and design objects may be seen as placed within a spherical space by three axes: P , D , and J .

The introduction of the energy saving principle into design of the mechanism of design features of an object, its dimensions, forces, proportions, and parameter values. On the one hand, the optimum design principle is in itself, essentially, a major focus of design work. On the other hand, it is important for the energy saving principle (see Fig. 1) is one of the basic principles of a human body.

Based on the works by A. K. Shapovalov, A. and Y. Kozlovskiy, C. Shannon, G. Gallego, and others, we can see that the minimum potential energy is associated with the maximum speed of information. This correlation is also shown on Fig. 1.

It is necessary to define what basic movements will occur in the proposed perceived model. We know that when we see a simple picture, the sequence of registration is related to motion, and a rapid motion

