X, Y, Z are determined by parametric equations of surface, generated by one of the generating lines of the moving cone in the moving coordinate system $OXYZ$ (Krivoshapko and Ivanov, 2010):

$$X = v\sin\beta\cos\varphi; \quad Y = v\sin\beta\sin\varphi; \quad Z = v\cos\beta.$$

$\theta = \alpha + \beta$, $\varphi = ku$ are right in the geometrical model 1 (Fig. 289).
$\theta = \alpha - \beta$, $\varphi = -ku$ are right in the variant A of geometrical model 2 (Fig. 291).
$\theta = \beta - \alpha$, $\varphi = ku$ are right in the variant B of geometrical model 2 (Fig. 293).

Here α – angle between cone generating line and cone axis for the fixed cone, β – angle between cone generating line and cone axis for the moving cone, $k = \sin\alpha/\sin\beta$.

Thus, the new variant of geometrical modeling of the kinematic ruled surfaces on the base of rolling one axoid along another for the pairs "cylinder-cylinder" or "cone-cone" is demonstrated.

Keywords: Analytical geometry ∘ computer graphics ∘ kinematic surface

Use of Geometry at Creation or the Analysis of Design and Art Objects

Iryna Kuznetsova
Natial Aviation University (Ukraine)

#056
Aug 05
04:45PM
H1

The majority of researches are carried out basing on Euclidean geometry, which is naturally accounted for by the character of the researchers' educational background, especially in the case of professional creators of design and art objects. Many existing researches can be extended on the basis of geometry branches that are not traditionally used by engineers and architects.

Within industrial design, geometrical modeling is connected with spatial relations and with shapes of design and art objects.

The use of point analysis begins with the general theory of composition as applied to Euclidean space and finishes with a study of pointillism. A set of points may be regarded either as a list of elements, or as a rule that defines whether a given point belongs to a particular image—which entirely corresponds to the essence of pointillism or mosaic. Fuzzy set apparatus is proposed as the most acceptable for studying the perception of pointillism and mosaic.

A geometric interpretation of how the information depends on the sets' coincidence degree is described. The comparative analysis of graphs is used for estimating the informativeness of nuances.

The interrelation of probability theory, geometry, and art is dealt with. The principle of maximum posterior probability, or the related principle of maximum likelihood is considered to be the most general and fundamental for probability representations. According to this principle, events having maximum aprioristic information are the most persistent. In the perception of an art or design object, the informational exchange between the object's creator

and user is more important than the information itself. The communication channel capacity from the source to the receiver has to be defined by the link possessing minimum capacity. Thus, an explanation is provided for the fact that many people are unable to perceive some art works of, say, Dada, surrealism or antidesign artists, because the lack of maximum likelihood precludes for them the possibility of individual perception.

The artistic technique of using straight lines in avant-garde painting is considered, represented by rayonism of M. Larionov.

The use of projective geometry apparatus is analyzed in rayonism, as well as in the works of individual authors, exemplified by Salvador Dali.

The importance of the theory of surfaces for creating design objects is emphasized.

A brief description is given of the analysis of art and design perception prognostication that is related to cyclic recurrence and is performed by means of differential geometry apparatus. The estimation is based on the Hausdorff dimension.

Topological transformations are illustrated through the analysis of papers by Prof. A. Fomenko.

Fractal geometry is represented with the traditional regard for the Golden Section, through the interpretation of works by Salvador Dali and J. Vermeer van Delf, and through landscapes as aggregates of fractal sets.

Dali's last works are viewed as his tribute to the mathematical catastrophe theory.

A short description is provided of dilatation as a popular technique used by designers. The use of a variety of geometric transformations in creating folk ornaments is noted, which is typical of folk embroidery of all nations, as well as of decorating the architectural structures in Moslem countries.

A number of researches in industrial design are pointed out, that are connected with explicit (as in dissertation papers in industrial design defended in the Specialized Board of the Kiev National University for Construction and Architecture, Ukraine) or inexplicit (as in the research work of A. Novikov, Russia) use of various sections of geometry.

The basic techniques of geometrical modeling in creating and studying the objects of design imply the use of Euclidean geometry, theory of sets, probability theory, differential geometry, projective geometry, fractal geometry, dilatation theory, geometric transformations.

Keywords: Analysis of design and art objects ∘ geometry

The Use of Multi-Media in the Teaching of Educational Unit for the Methods of Altering Some Patterns of Women's Clothing to Overcome the Problem of Fitting

#208
Aug 06
04:20PM
Poster

Thanaa Alsarhan[1], Hazem Abdelfattah[2]
[1]King Abdulaziz University (Saudi Arabia), [2]Helwan University (Egypt)

Fitting is one of the important criteria for consumers in their buying decision, every garment manufacturer have target segment with certain demographic characteristics, defining consumer profile, so because the fitting issue of garments has impact on the customers buying decision, the main concern of customers especially teenagers and women is to purchase

The 16th International Conference on Geometry and Graphics (ICGG 2014)

Program and Abstracts

edited by Hans-Peter Schröcker and Manfred Husty
Unit for Geometry and CAD, University of Innsbruck

Innsbruck, Austria

August 4–8, 2014

Program and Abstract of ICGG 2014, The 16th International Conference on Geometry and Graphics, Innsbruck, Austria, August 4–8, 2014.

Edited by Hans-Peter Schröcker and Manfred L. Husty, Unit for Geometry and CAD, University of Innsbruck, Austria.

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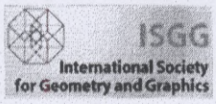

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The 16th International Conference on Geometry and Graphics

Innsbruck, August 4–8, 2014

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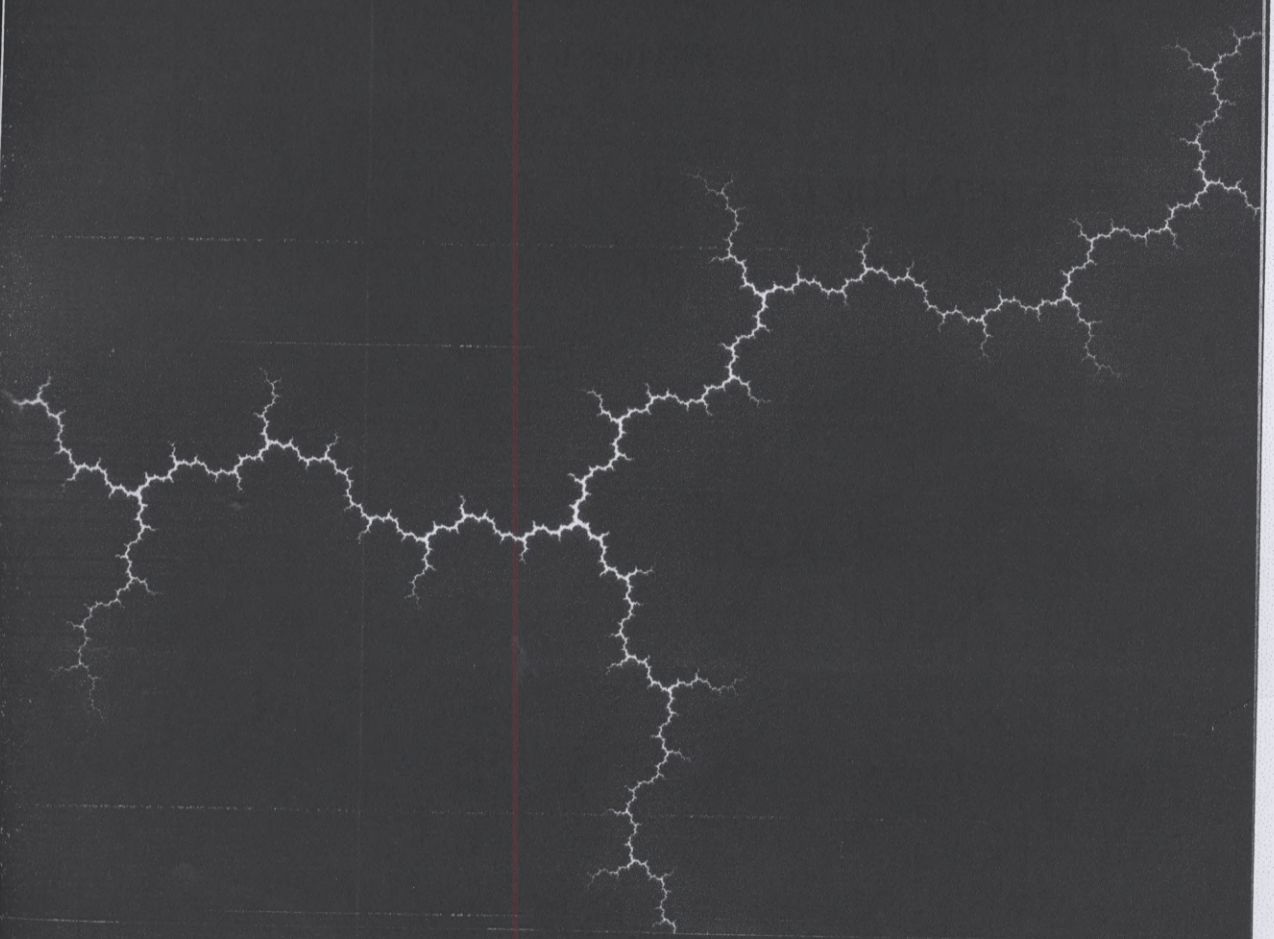

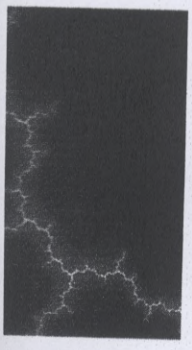

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