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NUMERICAL REPRESENTATION OF OBJECTS – REPRESENTATION OF 3D BODIES

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ABSTRACT

We are familiar with everything necessary to create the image of a point or a line in digital environment, we can represent many points in 2D and in 3D. So that these sets of points projected in a design software can be transformed into somewhat suggestive images of solid objects, it is necessary to know the order in which certain points must be joined together by segments or curves, thus suggesting to the operator constructive surfaces. The information needed to build a body image is stored in a "database", having a very well-defined ordered structure of numbers and characters. The structure of the database strongly influences the speed of work, the required memory of the program, the flexibility of the program, as well as the ease of writing the program. This paper presents some common ways of organizing data to generate different types of simple representations in ascending order of complexity.

KEYWORDS: point cloud, wireframe, polygon mesh, curves and curved surfaces.

REFERENCES

[1] Dogaru D., *Metode noi în proiectare, Elemente de grafică tridimensională (New methods in design, Three-dimensional graphic elements)*, Scientific and Encyclopedic Publishing House, Bucharest, 1988.

[2] Wolfgang Böhm, *Generating the Bézier points of B-spline curves and surfaces*, Computer-Aided Design, Volume 13, Issue 6, November 1981, Pages 365-366, https://doi.org/10.1016/0010-4485(81)90213-X.

[3] M.I.G. Bloor, M.J. Wilson, *Using partial differential equations to generate free-form surfaces*, Computer-Aided Design, Volume 22, Issue 4, May 1990, Pages 202-212, https://doi.org/10.1016/0010-4485(90)90049-I.

[4] Hoffmann, C., Hopcroft, J., *Automatic surface generation in computer aided design.* The Visual Computer 1, 92–100 (1985). https://doi.org/10.1007/BF01898351.

[5] T.S. Lan, S.H. Lo, *Finite element mesh generation over analytical curved surfaces*, Computers & Structures, Volume 59, Issue 2, 17 April 1996, Pages 301-309, https://doi.org/10.1016/0045-7949(95)00261-8.

[6] Uri Itai, Nira Dyn, *Generating surfaces by refinement of curves*, Journal of Mathematical Analysis and Applications, Volume 388, Issue 2, 15 April 2012, Pages 913-928, https://doi.org/10.1016/j.jmaa.2011.10.035.

[7] Márta Szilvási-Nagy, Teréz P. Vendel, *Generating curves and swept surfaces by blended circles*, Computer Aided Geometric Design, Volume 17, Issue 2, February 2000, Pages 197-206, https://doi.org/10.1016/S0167-8396(99)00045-X.

[8] Oancea N., *Surfaces Generation through Winding, Vol. I*, Galati University Press: Galati, Romania, 2004.

[9] Oancea N., *Surfaces Generation through Winding, Vol. II*, Galati University Press: Galati, Romania, 2004.

[10] Oancea N., *Surfaces Generation through Winding, Vol. III*, Galati University Press: Galati, Romania, 2004.