"Escherization" problem in context of intersubject integration

Nelly Bogdanova, Daugavpils University, Parades Street 1, Daugavpils, Latvia, LV5400,
nelly.bogdanova@du.lv

The definition of "Escherization" problem is formulated by Craig S. Kaplan and David H. Salesin (Kaplan & Salesin, 2000). Given a closed plane figure S (the "goal shape"), find a new closed figure T such that: (1) *T* is as close as possible to S; and (2) copies of *T* fit together to form a tiling of the plane. This definition is based on following definition of tiling (Grünbaum & Shephard ,1987). Let T_i *(i=1,2,...)* denote the tiles of a tiling *T* in the plane. A plane tiling *T* satisfies the following conditions:

1. The tiles T_i are closed sets. Meaning, each tile contains all its boundary points.
2. *T* consists of a countable family of sets $T = \{T_1, T_2, ...\}$. Meaning the number of tiles in the tiling can be counted.
3. The tiles T_i cover the plane without gaps. Meaning, the union of the sets $T_1, T_2, ...$ is to be the whole plane.
4. The tiles T_i do not overlap. Meaning, the interiors of the sets $T_1, T_2, ...$ are to be pair wise disjoint.

In this paper presents the periodic tiling with one motive. The periodic tiling is symmetry groups, that contains translations in nonparallel directions. The periodic tiling are described by notations: the crystallographic notation, isohedral types, Heesch system, Escher system and other. Notation gives the tiling construction rule.

The goal of paper is to investigate the teaching experience of the computer graphics for the students through the "Escherization" problem.

The "Escherization" problem is used as an interdisciplinary factor for the study courses of the study program "Computer design": bitmap graphics, vector graphics, two dimension animation, multimedia projects, and compositions; and as programming tasks for study program "Computer Science" students.

Results of this experience are student's art works, multimedia projects, demo programs.

References

Kaplan, S. C. & Salesin, H.D. (2000). Escherization. *Proceedings of SIGGRAPH 2000, in Computer Graphics.* PP.499-510, New Orleans, LA USA.

Grünbaum, B. & Shephard, G.C. (1987). *Tilings and Patterns*, New York, W.H.Freeman and Company.