Golomb Rep-Tiles and Fractals

Imameddin Amiraslanov
Institute of Inorganic and Physical Chemistry
National Academy of Science,
370143 Husein Javid avenue 29, Baku, AZERBAIJAN
Email: imam@gate.sinica.edu.tw

In 1964 Solomon W. Golomb suggested an unusual type of tile: nonperiodic rep-tiles. Unlike other kinds of tiling, rep-tiles one obtained by grouping individual tiles together to form larger replicas of themselves. One of the Golomb rep-tiles, namely Rep-4 (L-triomino) is shown in Figure.1(a,b) [1,2].

The multiple repetitive nature of the fragments, shown in Figure.1b, can be used to cover a plane completely, without leaving gaps or overlapping (Figure.2a). Through coloring the individual fragments shown in Figure.1c one can distinguish more clearly the organization of the system. As a result two kinds of mutually complementary and cross-tree like nonperiodic ornaments are obtained (Figure.2b). By careful examination of the final picture it is easy to see the fractal character of both kinds of cross-tree.
This ornament can have many applications, such as in decorating churches and cathedrals.

References