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NEW N-CHROMATIC STOCHASTIC TILINGS

Abstract
New coloured stochastic tiles, based on new automatic shape-generative algorithms, were created. While the first coloured tiles exhibited in 1995-97 (Calvesi e Mirolla 1995, Moschini e Briguglio 1997) were drawn using the SAT shape-generative method (Lombardo 1986), the new coloured tiles, here considered, were created using a slitly modified RAN method (Lombardo 2003, 2007). The RAN method was used to mantein the minimum number of regions and the minimum number of colours in the single tile. New tiling compositions are shown as well.

After creating new tilings and new automatic compositions of stochastic floors employing white/black tiles (Lombardo 2012), I faced the problem of generating new tilings and new automatic compositions of stochastic floors employing coloured tiles.
New coloured stochastic tiles, based on new automatic shape-generative algorithms, were created. While the first coloured tiles exhibited in 1995-97 (Calvesi e Mirolla 1995, Moschini e Briguglio 1997) were drawn using the SAT shape-generative method (Lombardo 1986), the new coloured tiles, that are here considered, were drawn using a slitly modified RAN method (Lombardo 2003, 2007). The RAN method was necessary because I wanted the tiles be minimal. That is to say: I avoided to employ a redundant number of colours and a redundant number of regions of the same colour as well. The formal problems to be solved are here exposed:
1- Create Minimal Maps of 3,4,5,6,7-Chromatic Tiles.
2- Trasform the Minimal Maps into Stochastic Maps using the RAN method.
3- Choose the best Set of colours for the task of colouring the Tiles.
4- Choose the best attributions of the best Set of colours to the Tile Regions.
5- Create new Automatic Compositions of N-Coloured tiles in a 24-Cells Floor.

1 - Drowing Minimal Maps of N-Chromatic Tiles.
In Fig. 1 the Minimal Maps from which the new 3-4-5-6-Chromatic Stochastic Tiles were created are shown. The creation of a Minimal 7-Cromatic Tile, being more complex, needs a Map of 11 Regions. The Minimal Map from which the 7-Chromatic Tile was created is shown in Fig. 2 . The capital letters (A, B, C, D, E, F, G) indicate the different Colours attributed to each Region.
The first 3 Regions of all Tiles must be coloured with the same colours to let all N-Chromatic Tiles eventually be used on the same floor without interrupting the continuity of the drawing.

INSERT FIG. 1 HERE
(Fig. 1 3-4-5-6-Chromatic Minimal Tiles)

INSERT FIG. 2 HERE

(Fig. 2 7-Chromatic Minimal Tile)

2 - Trasforming Minimal Maps into Stochastic Maps.
The RAN-E and RAN-V methods can transform a Minimal Map into a Stochastic Map. In the RAN-E method the New random-chosen Points become new Vertices and replace Visible (non-crossing) Edges of a minimal Map into a couple of new Edges joining in the new random-chosen Point. In RAN-V method the new random-chosen Points replace Visible Vertices of the minimal Map. In order to transform the Minimal Maps into Stochastic Maps I used a RAN-V set of 25 Points (from 1 to 25) plus a RAN-E set of 25 Points (from 26 to 50). The result is shown in fig. 3.

INSERT FIG. 3 HERE
(Fig. 3 3-4-5-6-7-Chromatic Stochastic Tiles)

3 - Tile colouring
The aesthetics of map colouring was tested in previous experiments. Different Tones of the same Hue are preferred to different Hues of the same Tone. Complementary spectral Hues are preferred to non complementary ones. Constant perceptual distance of the steps in the dark/light scale is preferred to random steps (Lombardo 1999).

4 - Positioning the Colour Set in the Tile
The first 3 Regions are located at the border of the tiles, just where the tiles must join each other in shaping stochastic floors, therefore they must allways be of the same colours. By now considering the results of map colouring experiments and new experimental colour tests, I was led to the tendencies shown in Tab 1, yet to better:

TAB. 1

3-Chromatic Tile:
A = Medium green, B = Dark magenta, C = Dark green.

4-Chromatic Tile:
A = Medium green, B = Dark magenta, C = Dark green, D = Light green.

5-Cromatic Tile:
A = Medium green, B = Dark magenta, C = Dark green, D = Light green, E = Light magenta

6-Chromatic Tile:
A = Medium green, B = Dark magenta, C = Dark green, D = Light green, E = Light magenta, F = Light yellow.

7-Cromatic Tile:
A = Medium green, B = Dark magenta, C = Dark green, D = Light green, E = Light magenta, F = Light yellow, G = Medium Violet

5 - Rotational ordering of the tiles in a 24-cells floor.
All algorithms of compositional and rotational ordering of the tiles described in my previous papers (Lombardo 2012) were tested to the New N-Coloured Tiles as well. Here only new stochastic compositions of rotations are shown with different degrees of disorder in a 4 x 6 = 24 cells flooor. Tab. 2 shows a distribution named Perfect Disorder: all lines sum 15, all columns sum 10. Tab. 3 shows a distribution named Perfectly Disordered Disorder: the lines sum alternatively 11 or 19, all columns sum 10. Tab. 4 shows a distribution named Symmetric Perfect Disorder: all lines sum 15, all columns sum 10. All possible rotations around each corner of the tile are employed.

TAB. 2
Perfect Disorder

1	2	3	2	4	3
3	4	1	4	2	1
2	1	2	3	3	4
4	3	4	1	1	2

TAB. 3
Perfectly Disordered Disorder

1	2	1	4	2	1
3	4	3	2	4	3
2	1	4	1	1	2
4	3	2	3	3	4

TAB. 4
Symmetric Perfect Disorder

1	2	4	1	3	4
4	3	3	2	2	1
3	4	2	3	1	2
2	1	1	4	4	3

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