Prof. Dr. Alfred Toth

The graphs of intra- and trans-semiotic connections

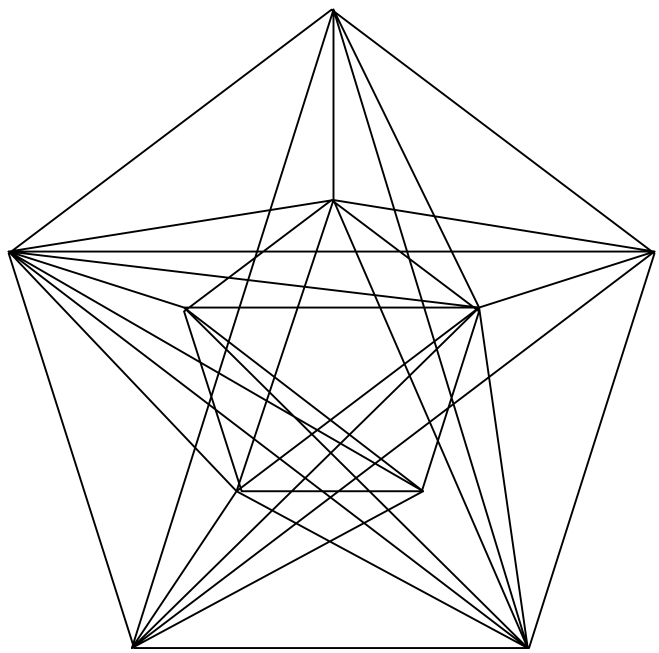
1. In Toth (2008a, pp. 28 ss.), I introduced the intra- and trans-semiotic connections. The intra-semiotic connections are the semiotic relations inside of the 10 sign classes, their dual reality thematics and between the sign classes and their reality thematics, belonging to the same sign classes, in short, the semiotic connections **inside** of semiotic representation systems. The trans-semiotic connections are the semiotic relations between the 10 sign classes, their dual reality thematics or between reality thematics of different sign classes, in short, the semiotic connections **between** semiotic representation systems.

We will deal first with trans-semiotic connections and then with intra-semiotic connections.

2. In the following table, the "fractional" notation X/Y= Z (where X ≠ Y) indicates that sign classes X and Y share Z sub-signs:

1/2 = 2; 1/3 = 2; 1/4 = 1; 1/5 = 1; 1/6 = 1; 1/7 = 0; 1/8 = 0; 1/9 = 0; 1/10 = 0
2/3 = 2; 2/4 = 2; 2/5 = 1; 2/6 = 1; 2/7 = 1; 2/8 = 0; 2/9 = 0; 2/10 = 0
3/4 = 1; 3/5 = 2; 3/6 = 2; 3/7 = 0; 3/8 = 1; 3/9 = 1; 3/10 = 1
4/5 = 2; 4/6 = 1; 4/7 = 2; 4/8 = 1; 4/9 = 0; 4/10 = 0
5/6 = 2; 5/7 = 1; 5/8 = 2; 5/9 = 1; 5/10 = 1
6/7 = 0; 6/8 = 1; 6/9 = 2; 6/10 = 2
7/8 = 2; 7/9 = 1; 7/10 = 0
8/9 = 2; 8/10 = 1
9/10 = 2

Therefore, the following pairs of sign classes or reality thematics are not connected: 1/7; 1/8; 1/9; 1/10; 2/8; 2/9; 2/10; 3/7; 4/9; 4/10; 6/7; 7/10, and the respective graph is not a regular graph, but looks like in the picture beneath:



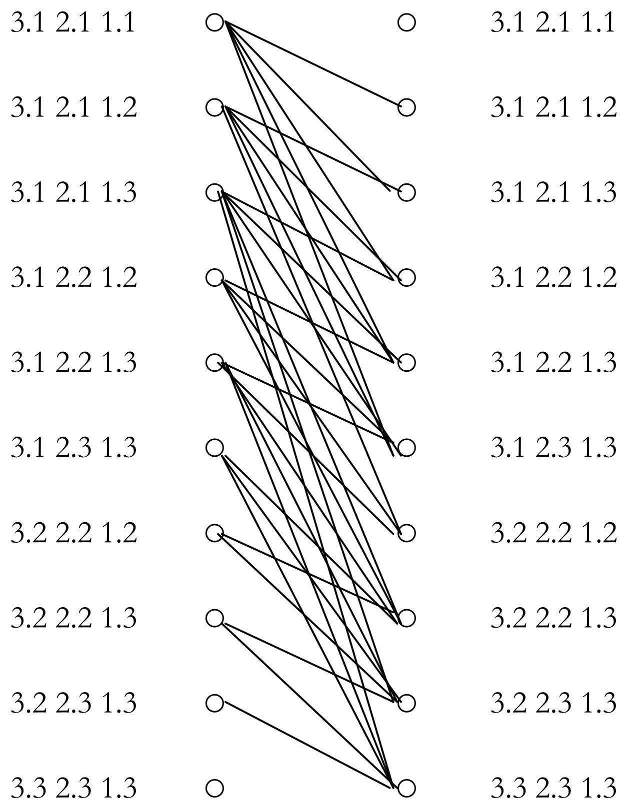
As we see, the number of adjacent edges is for each vertex:

Vertex 1:	6	Vertex 6:	7
Vertex 2:	6	Vertex 7:	8
Vertex 3:	8	Vertex 8:	5
Vertex 4:	7	Vertex 9:	6
Vertex 5:	9	Vertex 10:	6

so that we get the following adjacency matrix:

$$\begin{pmatrix} 0 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \end{pmatrix}$$

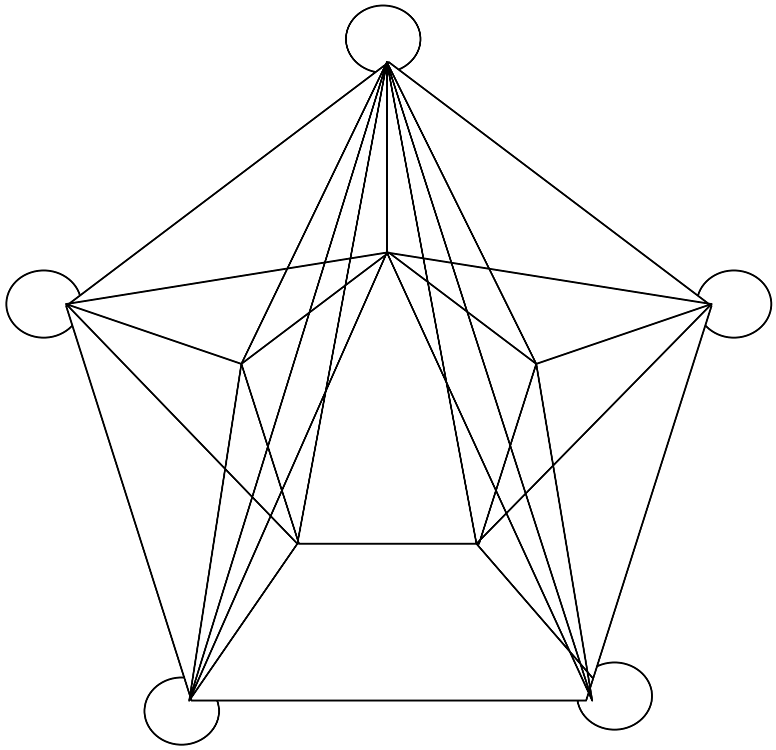
Since semiotics can be described by matroids, and especially the above graph can be displayed as a transversal matroid (Toth 2008b, c), we get the following transversal graph of the 10 sign classes (or reality thematics):



3. Each sign class is connected with its reality thematic by at least 1 sub-sign:

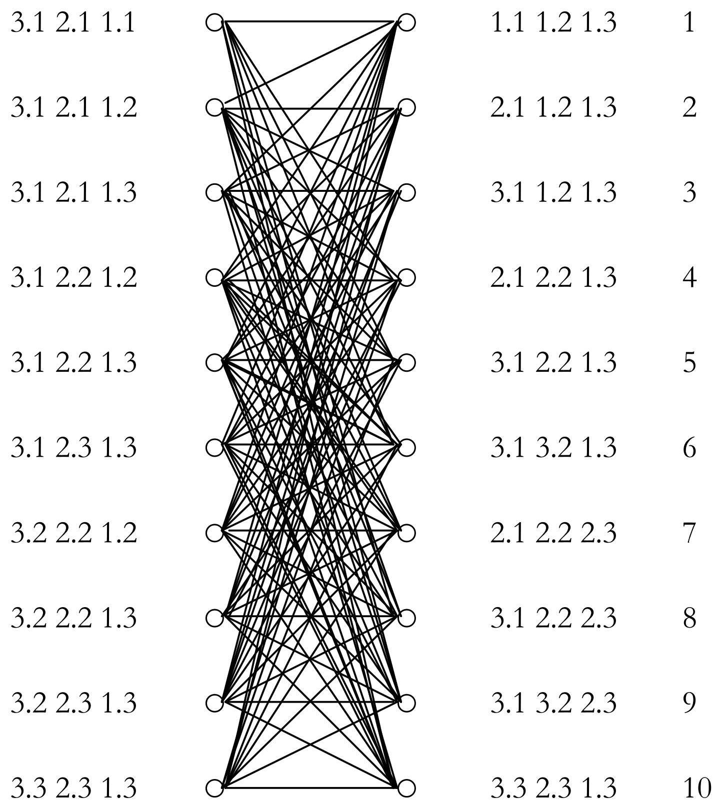
1 (3.1 2.1 $\underline{1.1}$ × $\underline{1.1}$ 1.2 1.3)
2 (3.1 $\underline{2.1}$ $\underline{1.2}$ × $\underline{2.1}$ $\underline{1.2}$ 1.3)
3 ($\underline{3.1}$ 2.1 $\underline{1.3}$ × $\underline{3.1}$ 1.2 $\underline{1.3}$)
4 (3.1 $\underline{2.2}$ 1.2 × 2.1 $\underline{2.2}$ 1.3)
5 ($\underline{3.1}$ $\underline{2.2}$ $\underline{1.3}$ × $\underline{3.1}$ $\underline{2.2}$ $\underline{1.3}$)
6 ($\underline{3.1}$ 2.3 $\underline{1.3}$ × $\underline{3.1}$ 3.2 $\underline{1.3}$)
7 (3.2 $\underline{2.2}$ 1.2 × 2.1 $\underline{2.2}$ 2.3)
8 (3.2 $\underline{2.2}$ 1.3 × 3.1 $\underline{2.2}$ 2.3)
9 ($\underline{3.2}$ $\underline{2.3}$ 1.3 × 3.1 $\underline{3.2}$ $\underline{2.3}$)
10 ($\underline{3.3}$ 2.3 1.3 × 3.1 3.2 $\underline{3.3}$)

Thus, we can differentiate between monadic, dyadic and triadic intra-semiotic sign connections.



Therefore, in the adjacency matrix of the above graph, each i,j = 1.

If we now display the above graph as a transversal, we can see that the intra-semiotic connections are much richer than the trans-semiotic ones:



Especially, each vertex is connected with itself, and so, the main diagonal of the intra-semiotic matrix consists of 1's, while the adjacency matrix of the loop-free trans-semiotic graphs consists of 0's.

Bibliography

Toth, Alfred, Semiotic Ghost Trains. Klagenfurt 2008 (2008a)
Toth, Alfred, A class of semiotic graphs from transversals. Ch. 64 (2008b)
Toth, Alfred, Transversals in semiotics. Ch. 38 (vol. I) (2008c)