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A case of polysemy in semiotic graphs

1. In Tanenbaum (1999), the phenomenon of graph polysemy has been introduced and considered a "strange loop", referring to situations where a single entity can be seen to mean more than one mathematical object. Although in semiotics, the mapping of set theoretic structures to graphs is normally bijective (cf. Toth 1996; 2007b; 2008a, pp. 28 ss.), we encounter a very interesting case of polysemy in semiotic graphs using triples of morphisms for sign sets (cf. Toth 2008b, c, d).

2. The category theoretic method used here is based on dynamic semiotic morphisms (cf. Toth 2008a, pp. 159 ss.). Thereby, a semiotic morphism is assigned to each triadic and each trichotomic relation of a sign class or reality thematic, f. ex.:

(3.1 2.2 1.3) → (3.1 2.2), (2.2 1.3), (3.1 1.3):

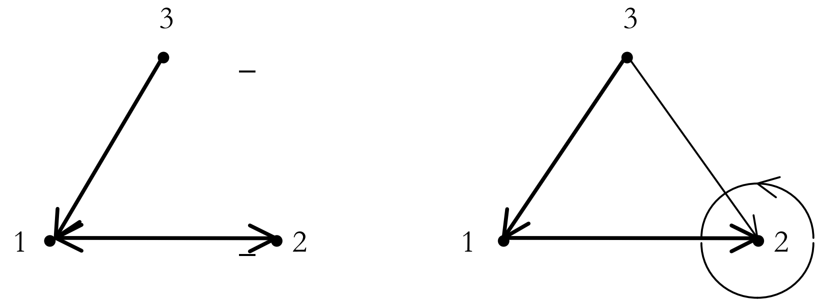
(3.1 2.2) ≡ [$\beta°$, α]
(2.2 1.3) ≡ [$\alpha°$, β]
(3.1 1.3) ≡ [$\alpha°\beta°$, $\beta\alpha$]

If we use dynamic category theoretic notation, we may write the 10 classes as follows:

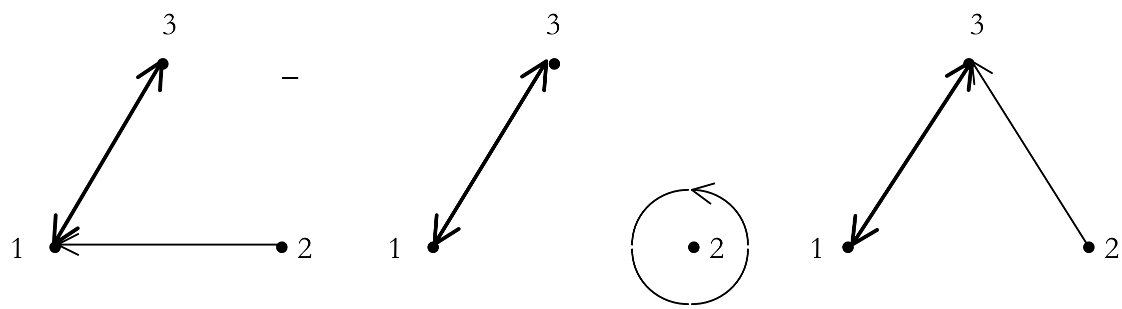
(3.1 2.1 1.1) →	[$\beta°$, id1], [$\alpha°$, id1],	[$\alpha°\beta°$, id1]	→ (3.2 1.1) (2.1 1.1)	(3.1 1.1)
(3.1 2.1 1.2) →	[$\beta°$, id1], [$\alpha°$, α],	[$\alpha°\beta°$, α]	→ (3.2 1.1) (2.1 1.2)	(3.1 1.2)
(3.1 2.2 1.2) →	[$\beta°$, α], [$\alpha°$, id2],	[$\alpha°\beta°$, α]	→ (3.2 1.2) (2.1 2.2)	(3.1 1.2)
(3.1 2.1 1.3) →	[$\beta°$, id1], [$\alpha°$, $\beta\alpha$],	[$\alpha°\beta°$, $\beta\alpha$]	→ (3.2 1.1) (2.1 1.3)	(3.1 1.3)
(3.1 2.2 1.3) →	[$\beta°$, α], [$\alpha°$, β],	[$\alpha°\beta°$, $\beta\alpha$]	→ (3.2 1.2) (2.1 2.3)	(3.1 1.3)
(3.1 2.3 1.3) →	[$\beta°$, $\beta\alpha$], [$\alpha°$, id3],	[$\alpha°\beta°$, $\beta\alpha$]	→ (3.2 1.3) (2.1 3.3)	(3.1 1.3)
(3.2 2.2 1.2) →	[$\beta°$, id2], [$\alpha°$, id2],	[$\alpha°\beta°$, id2]	→ (3.2 2.2) (2.1 2.2)	(3.1 2.2)
(3.2 2.2 1.3) →	[$\beta°$, id2], [$\alpha°$, β],	[$\alpha°\beta°$, β]	→ (3.2 2.2) (2.1 2.3)	(3.1 2.3)
(3.2 2.3 1.3) →	[$\beta°$, β], [$\alpha°$, id3],	[$\alpha°\beta°$, β]	→ (3.2 2.3) (2.1 3.3)	(3.1 2.3)
(3.3 2.3 1.3) →	[$\beta°$, id3], [$\alpha°$, id3],	[$\alpha°\beta°$, id3]	→ (3.2 3.3) (2.1 3.3)	(3.1 3.3)

Thus the 10 sign classes can be summed up in 6 groups according by their common third morphisms, three out of which therefore turn out to be polysemic, since we have:

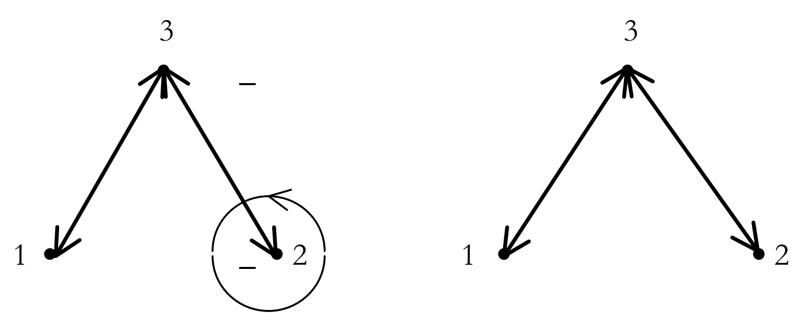
(3.1 1.2) → (3.1 2.1 1.2)
(3.1 1.2) → (3.2 2.2 1.2)



(3.1 1.3) → (3.1 2.1 1.3)
(3.1 1.3) → (3.1 2.2 1.3)
(3.1 1.3) → (3.1 2.3 1.3)



(3.1 2.3) → (3.2 2.2 1.3)
(3.1 2.3) → (3.2 2.3 1.3)



The relations of the third morphisms and thus the polysemic ones are in bold. Since some relations appear only in the third morphisms of the sign set triples, the respective graphs show two tetradic sign relations, namely (3.1 3.2 2.2 1.2) and (3.1 3.2 2.3 1.3), and one pentadic sing relation, namely (3.1 3.2 2.3 2.2 1.3), cf. Toth (2007, pp. 173 ss.).

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