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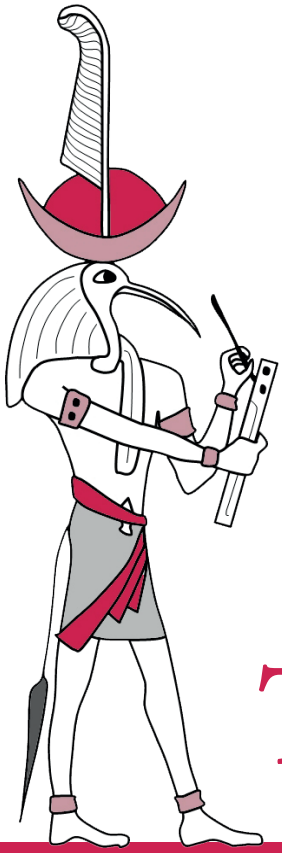

TOTh 2021

Terminologie & Ontologie : Théories et Applications

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Actes de la conférence

TOTh 2021

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3 & 4 juin 2021

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Avant-propos

La pandémie de COVID-19 a durablement impacté nos façons de travailler, et en particulier l'organisation d'événements tels que les conférences. Si rien ne peut remplacer la richesse des contacts humains que procure le présentiel, il nous faut accepter d'autres modes de participation et d'échanges. La participation à distance, l'enregistrement des interventions en font partie. Au-delà d'une gestion différente des coûts et du temps, cela offre d'autres perspectives dont une plus grande diffusion des travaux menés et donc une meilleure visibilité.

Nous avons pu revenir en 2021 à la traditionnelle planification de TOTh la 1re semaine de juin établie depuis 2007. La formation et la conférence se sont déroulées conjointement en présentiel et à distance, avec une très forte participation à distance, les restrictions sanitaires étant toujours en vigueur. L'organisation est certes plus compliquée et même si le présentiel devrait, nous l'espérons, revenir en force l'année prochaine, la participation à distance sera dorénavant proposée. L'Université de Savoie et l'équipe Condillac sur lesquelles reposent l'organisation de la conférence et la publication des actes seront plus fortement impliquées.

Avant de présenter les actes de cette année, j'aimerais remercier à nouveau les membres du Comité international de programme 2021 pour leur travail. Fortement mobilisés – les soumissions sont évaluées par au moins trois relecteurs – ils sont garants de la qualité des travaux menés à TOTh. Je rappelle que le Comité de programme est constitué chaque année à partir du Comité scientifique de TOTh en fonction des soumissions reçues. Le Comité scientifique est composé de 75 membres, experts internationalement reconnus du domaine, représentant 24 nationalités différentes.

La Conférence TOTh 2021 s'est ouverte avec la conférence invitée de notre collègue Nicola Guarino, bien connu des « ontologues », qui a dirigé le laboratoire d'ontologie appliquée de Trento rattaché au Conseil National de la Recherche italienne. Son intervention a porté sur « Events and their Names », un sujet aussi difficile qu'il est important. Nous présentons ici un résumé d'une communication que Nicola Guarino développera dans une communication ultérieure.

Notre collègue, François Gaudin, de l'Université de Rouen, a proposé cette année une Disputatio nous invitant à une lecture sociolinguistique de la référence chez Hilary Putnam.

Sur les 13 communications présentées, seules 10 ont été retenues pour publication. Elles ont abordé de nombreux sujets tant théoriques que pratiques portant sur des domaines aussi variés que les humanités numériques, la finance, les modèles de représentation, ou l'harmonisation de termes et de concepts.

Cette année nous avons eu le plaisir de décerner deux prix jeunes chercheurs. Cela est suffisamment exceptionnel pour que nous y consacrions quelques lignes. Instauré en 2011, ce prix n'a été décerné que deux fois, en 2011 et en 2018. Cette année ce sont deux jeunes chercheuses, toutes les deux italiennes, qui ont été récompensées. Cristina Farroni, de l'Università degli studi di Macerata, a présenté une contribution intitulée « Collaborative terminology management in a business environment : a case study in the field of wood paints and coatings ». Federica Vezzani, de l'Università degli studi di Padova, nous a présenté ses travaux en français sur le thème de « La gestion de (méta)données terminologiques « FAIR » : le répertoire de catégories de données de la ressource TriMED ».

Plus de 60 personnes ont suivi de manière assidue les présentations, ce qui correspond à la participation moyenne à la conférence. 21 pays étaient représentés : Afrique du Sud, Albanie, Allemagne, Autriche, Belgique, Chine, Espagne, États-Unis, France, Ghana, Grèce, Hongrie, Irlande, Italie, Lituanie, Luxembourg, Portugal, Roumanie, Royaume-Uni, Sénégal, Suisse.

Je vous invite à découvrir les communications que nous avons retenues à travers ces actes réalisés avec M^me^ Catherine Brun et publiés aux Presses Universitaires Savoie Mont-Blanc. Les actes des années précédentes sont accessibles à partir du site de la conférence (http://toth.condillac.org/) et des Presses Universitaires Savoie Mont Blanc (https://btk.univ-smb.fr/livres/?fwp_collections_revues=terminologica).

Avant de vous souhaiter bonne lecture, j'aimerais terminer en remerciant le Ministère de la Culture, et plus précisément la Délégation Générale à la Langue Française et aux Langues de France, l'Université Savoie Mont-Blanc, l'École Polytech Annecy-Chambéry et l'équipe Condillac pour leur support et leur aide financière à l'organisation de la conférence et à la publication des actes.

Christophe Roche
Président du Comité scientifique

Sommaire

Transformation of Graphical Semiotic Models into a Graph-based Formal Representation

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Abstract. Graphical models are often proposed for the purpose of explanative visualisation in different theories of signs, meaning, concepts, or references. We describe work dealing with the transformation of such graphical models into a graph-based formal representation language. The final aim of this formal representation is to be able to mark elements of those different theories as being compatible, complementary, or disjunct.

1. Introduction

The meaning (or semantic, or semiotic) triangle proposed by Ogden and Richards (1923) is a widely known graphical model summarizing the views of the authors on how a “symbol” is related to a “referent” via a “thought

or reference"[1]. There are related designations for those elements, like (in the same order) "sign", "object", "concept", etc. The "idea" of using a triangle for such a purpose was not entirely new and has been exploited for example by Charles Sanders Peirce for representing relations between a "representamen" (or "sign") and an "object" via an "interpretant"[2].

In this paper we discuss the use of an integrated graph-based formal representation for the encoding of different graphical semiotic models used for visualizing theories of the sign, meaning or references. Besides the triangle model we consider the so-called dyadic model proposed by de Saussure (1916), and the semiotic quadrangle introduced by Eugen Wüster (1959)[3] or the semantic quadrangle by G. P. Melnikov (as displayed by Wang (2016)). We also deal, tentatively, with proposals that are combining triangles, like those described in (Sowa, 2010) or (Roche, 2007).

The deployment of geometrical figures for visualising sign or meaning theories are directly "inviting" to the use of graph-based formalisms for their formal encoding. We can even consider the dyadic model of de Saussure as consisting of two nodes related by an edge. For the triangles and quadrangles, we can see the angles as nodes, and the names carried by those angles as the labels of the nodes. And the lines between the angles can be considered as (possibly labelled) edges between nodes. We are therefore opting for investigating the use of the Resource Description Framework (RDF)[4] and vocabularies based on it for offering a formal representation of such graphical semiotic models, which were conceived for describing the sign or the meaning. In the longer term, our work is dealing with the linking of formal representation models for lexicographic, terminological, and general knowledge data.

An inspiration and motivation for our work was given by "YAT" ("Yet Another Triangle") which at a metalevel is describing the possible relations

1 This graphical model, as this is the case for all other graphical models, is displayed in the Annex, here with the number Annex:2.

2 We take this information from (Sowa, 2010), but we are not aware of a concrete triangle designed by Peirce himself. (Chandler, 2007, page 30) is proposing such a concrete triangle, as suggested by one of his students. This graphical representation is given in Annex:3.

3 (Ivanović, 2020) gives a detailed description of the various quadrangles introduced by Wüster. We note that the original German text for "semiotic" quadrangle is "vierteiliges Wortmodell" (*four-part word model*), where the "word" is thus playing a central role.

4 For RDF, see https://www.w3.org/TR/rdf-primer/. For RDF-based vocabularies, see (among others) https://www.dnb.de/EN/Professionell/Metadatendienste/Exportformate/RDF-Vokabulare/rdf.html.

between 3 types of languages, as described by Roche (2007). We display in Fig. 1 this "meta" triangle.

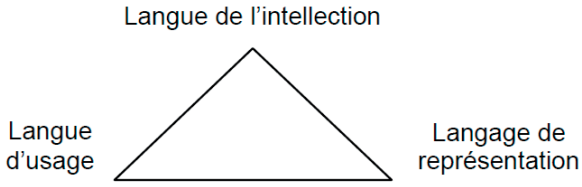

Fig. 1 – *The "meta" triangle by Roche (2007)*

We situate our work in the realm of the "Langage de représentation", but with the aim to describe relations that are existing between those three types of languages. We note that in this triangle the word "langue" is used for labelling two angles, and "langage" for one angle. The French language allows this distinction, which in this specific usage by Roche is marking the abstract meaning of a language as a (formalized) encoding system ("langage"), while the "langue" is the language as used in communicative situations. In fact, as can be seen in the next sections, we use a specific "langage de représentation" for encoding elements of both the "langue de l'intellection" and the "langue d'usage", relating them to conceptual and ontological elements that are encoded in the same type of "language de représentation".

2. RDF, SKOS, and OntoLex-Lemon

The Resource Description Framework (RDF) is a W3C recommendation that was developed for easing the exchange of data, with a focus on interoperability. The basic structure of RDF is a triple expressing a subject and its relation to an object, representing in fact a graph-based model. On the top of RDF, more complex and expressive knowledge representation languages have been designed, also in the context of the so-called W3C Semantic Web Stack[5].

5 See https://en.wikipedia.org/wiki/Semantic_Web_Stack for an introduction to the Semantic Web Stack.

RDF(s)[6] and OWL[7] are supporting a higher expressivity and reasoning in the representation language, while remaining in the paradigm of the triple as the basic modelling approach.

SKOS (Simple Knowledge Organization System) is another W3C recommendation, yet an RDF-based vocabulary that was developed as "a model for expressing the basic structure and content of concept schemes such as thesauri, classification schemes, subject heading lists, taxonomies, folksonomies, and other similar types of controlled vocabulary."[8]

OntoLex-Lemon (Cimiano *et al*. 2016) is another RDF-based vocabulary which was originally designed for modelling natural language expressions used in the labels of OWL, RDF(s) and RDF encoded ontologies. But extensions to the basic OntoLex-Lemon model made it also suitable for lexicographic purposes[9], and the inclusion of the SKOS vocabulary put OntoLex-Lemon in the position of internally linking lexical elements with conceptual elements included in terminologies, thesauri, and other conceptual schemes. The picture in Fig. 2 gives an overview of the core module of OntoLex-Lemon.

In the following sections, we show how this model can be used for representing the different types of graphical models of the sign or meaning theories we have mentioned in Section 1. For this purpose, we will in each case use the labels displayed in Fig. 2.

6 RDF(s), or also RDFS, RDF-S, RDF/S, stands for RDF Schema. See https://www.w3.org/TR/rdf-schema/ for more details.

7 OWL stands for Web Ontology Language. See https://www.w3.org/TR/owl2-primer/.

8 See https://www.w3.org/TR/skos-primer/ for more details.

9 See the OntoLex-Lemon "lexicog" module: https://www.w3.org/2019/09/lexicog/ and (Bosque Gil *et al*., 2019).

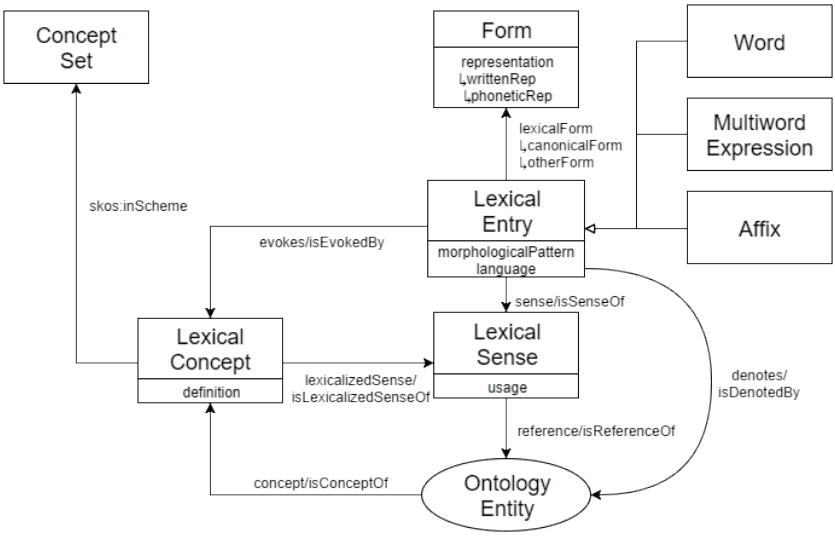

Fig. 2 – *The core module of OntoLex-Lemon, taken from https://www.w3.org/2016/05/ontolex/.*

3. Modelling the graphical Models of the Sign Theories in OntoLex-Lemon

In the following sections we concentrate on four upper classes of OntoLex-Lemon, not taking into account the ontolex:ConceptSet class and the ontolex:Form class. This results in a kind of a "quadrangle", which is displayed in Fig. 3 below. We will "decompose" this quadrangle in all possible triangles included in it to represent the different graphical semantic/semiotic models we can deal with.

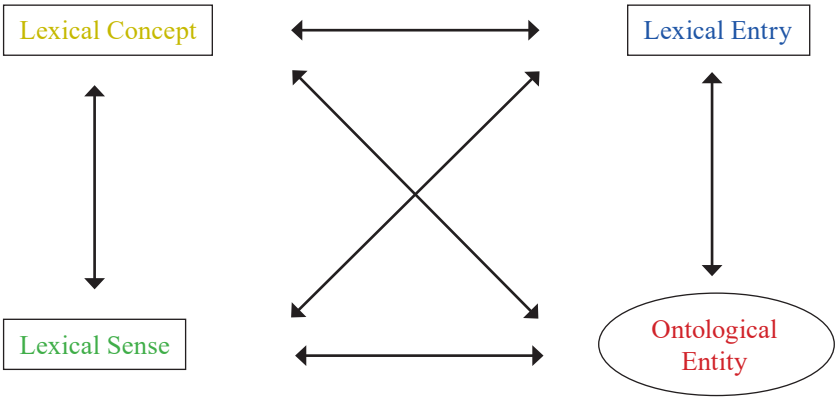

Fig. 3 – *Four upper classes of OntoLex-Lemon and the relations between them*

3.1. The Dyadic Models

We start with the dyadic model by de Saussure (see Annex:1). As quoted by Sowa (2010), this model places unity of the sign uniquely in the relation between a "sound-image" (which in OntoLex-Lemon would be integrated as a subclass of a Form related to a LexicalEntry) and a "concept", which in OntoLex-Lemon we encode as a LexicalConcept (a subclass of a skos:Concept). Sowa (2010) is contrasting this approach to model-theoretic semantics approaches which link every natural language expression to a real object in the world[10]. This different dyadic model can be expressed in OntoLex-Lemonby the property "denotes" which relates a lexical entry directly with an ontology entity.

But in doing so, OntoLex-Lemon still opens the possibility to establish links of the dyadic constituents to other elements of its model.

10 Quoting Sowa (2010): "Tarski, Quine, and many other logicians […] focused on the dyadic link between the sign and object."

3.2. The Triadic Model

The semantic triangle by Ogden and Richards (1923), displayed in Annex:2, contains interestingly a disjunction in the label associated with its top angle: "THOUGHT OR REFERENCE". We suggest therefore at this place two OntoLex-Lemon "triangles" for possibly representing the triadic model by Ogden and Richards. One mediating the symbol (LexicalEntry) with the object (Ontology) via the "thought" (LexicalConcept) and one via the "reference" (LexicalSense), as this is visualized in Fig. 4. While the triangle by Ogden and Richards is not foreseeing a direct relation between the symbol and the object, we have the possibility in OntoLex-Lemon to link a LexicalEntry directly to an Ontology Entity, via the ontolex:denotes property.

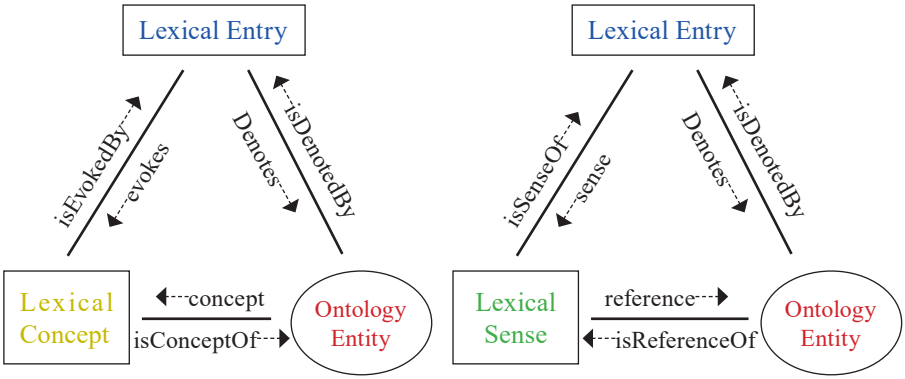

Fig. 4 – *Two "ontolex" triangles for representing the Ogden-Richards semiotic triangle, taking into account the disjunction "THOUGHT OR REFERENCE" in its top angle. We represent this disjunction with the classes "ontoloex:LexicalConcept" (left) and "ontolex:LexicalSense" (right).*

At this stage of our work, we do not have yet a proposal for representing the "Peircean triangle" (Annex:3) in OntoLex-Lemon and related RDF vocabularies.

3.3. The Semiotic/Semantic Quadrangles

In the case of the semantic quadrangle by G. P. Melnikov (Annex:4. a.), we again note the dotted lines between the symbol (sign) and the object (thing).

But in OntoLex-Lemon, we do have the "ontolex:denotes" property that allows to link directly an ontolex:LexicalEntry to an ontology entity (standing for real world objects) as a direct relation, which is parallel to the indirect relation mediated by an ontolex:LexicalSense. We refer here to Fig. *2* for the OntoLex-Lemon visualisation.

We display in below the other 2 triangles that can be extracted from the quadrangle displayed in Fig. *2*, so that all the possible "ontolex" triangles (which are also included in the semantic quadrangle) are rendered in this paper, showing that all the aspects of this quadrangle can be represented in OntoLex-Lemon, even those cases in which neither a lexical entry nor an ontological entity are involved.

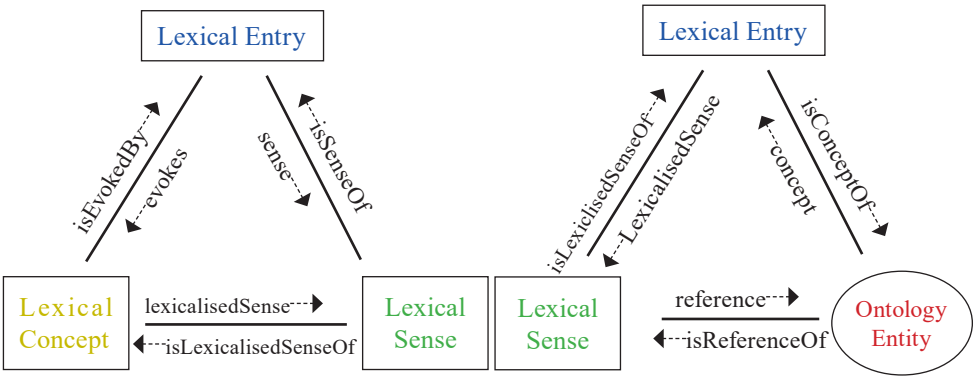

Fig. 5 – *The remaining two triangles that can be extracted from the OntoLex-Lemon "quadrangle", one without considering the real world (ontology entity) and one not considering the symbol (lexical entry)*

We are currently working on the transposition of the various quadrangles by Wüster into OntoLex-Lemon.

3.4. The Combined Triangles

Some authors propose a combination of triangles, like Roche (2007 – Annex:5)[11] and Sowa (2010 – Annex:6). Those proposals are highly interest-

11 This graphical model is a corrected version of another graphical model presented in the same publication, and which is displayed in Annex:7.

ing as they allow to formulate relations between triangles, visualizing additional aspects of the sign, the meaning, or the references. While Roche (2007) rather establishes a conceptual relation between two triangles, Sowa (2010) introduces a kind of sequential relations between triangles, which can be horizontal (marking possibly a temporal sequence) or vertical. We deal in this paper only with the proposal by Roche (2007).

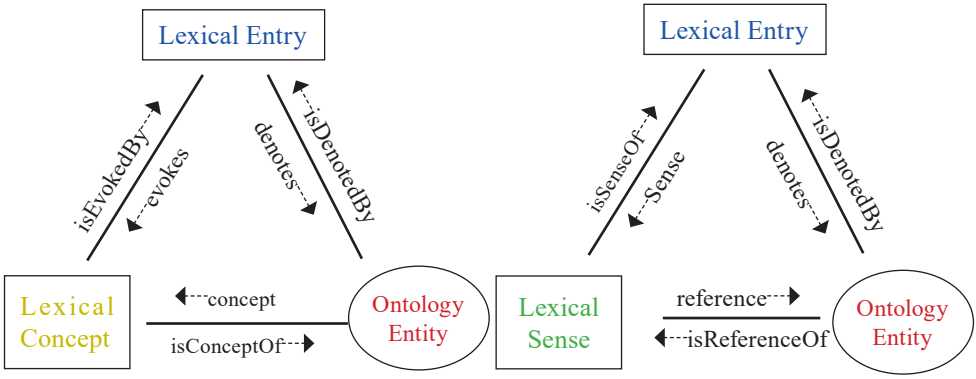

Fig. 6 –??

In our opinion, the two "OntoLex-Lemon triangles" displayed Fig. 4 (and repeated just above) are very close to the latest version the double triangle by Roche (2007), which is shown in Annex:5. But we need to get into more details to explain our view. It is also useful to study a former version by Roche of this double triangle, which is displayed in Aneex:7. There we can see that the relation between the "signifiant" (in the left triangle) and the "identifiant" (in the right triangle) is represented as a set intersection. This type of representation disappeared in the double triangle displayed in Annex:5 (where we notice that both triangles have exchanged their position, but we see just a practical reason for this exchange of positions). Common to both versions of the double triangle is that the triangles are related to each other by a set intersection representation. We can assume that this set intersection is the type of relations that is existing between "concept" and "signifié" on the one hand, and "identifiant" and "signifiant" on the other hand. Those relations are represented by double arrows in the graphic displayed in Annex:5.

We suggest in a first step to specialise the inverse OntoLex-Lemon property "lexicalizedSense/isLexicalizedSenseOf", which is linking a LexicalConcept

to a LexicalSense, to a functional property. This can ensure the uniqueness of interpretation out of a multitude of senses possibly associated with lexical items used in the context of a terminology, which requires an unambiguous lexical realisation of its concepts. This would respond to the top double arrow in the double triangle by C. Roche. Concerning the bottom double arrow in this double triangle, one solution could be to extend the OntoLex/Lemon, adding a "terminological entry", as a parallel element to the "lexical entry", as suggested in (Kudashev and Kudasheva, 2010), who are using the expressions "terminological lexeme" and "lexicographic lexeme". But our preference goes in not duplicating elements, and we think that the dense interlinking of a LexicalEntry (and all its forms) with a Lexical Concept and a LexicalSense, whereas the linking between a lexical concept and a lexical sense would be restricted to have maximally one instance, should suffice to distinguish a "terminological" entry from a "lexicographic" one. This way, we can deal with the distinction operated by C. Roche between an "identifiant" and a "signifiant", while the "identifiant" can remain encoded as non-lexical code in our RDF-based representation.

4. Conclusions and Future Work

We presented on-going work in re-using the OntoLex-Lemon model and associated RDF vocabularies for formally representing a series of graphical visualizations of different theories of the sign, the meaning, or the references, which are playing a role in the way terminology is situating itself in comparison and cooperation with other fields that have the language at their core, as this is exemplified in the work by C. Roche (2007) on establishing an "onto-terminology".

While there are still some instances of graphical models to be dealt with, our future efforts will also go in investigating the concrete impact of our work, as it could be offering a meta description of the relation between computational ontologies, terminologies and lexicons, a programme already described in (Roche, 2007), where a graphical representation of the relation between the languages of representation, of usage and of thought is given.

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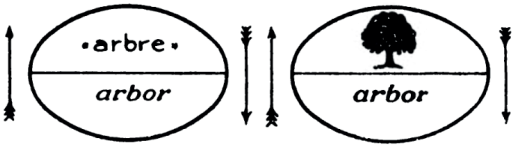
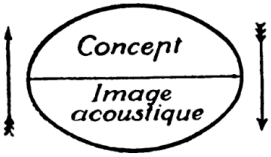
Annex: Dyadic Models, Triangles, Quadrangles and Compositions

1. Dyadic model of de Saussure

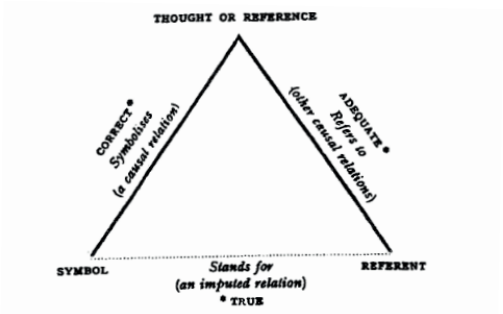


https://fr.wikisource.org/wiki/Cours_de_linguistique_g%C3%A9n%C3%A9rale/Texte_entier#/media/Fichier:Saussure-cours-p-099b.png



https://fr.wikisource.org/wiki/Cours_de_linguistique_g%C3%A9n%C3%A9rale/Texte_entier#/media/Fichier:Saussure-cours-p-099a.png

2. Triadic Model of Ogden and Richards



https://courses.media.mit.edu/2004spring/mas966/Ogden%20Richards%201923.pdf, page 11

3. (possible) Triadic Model of Peirce

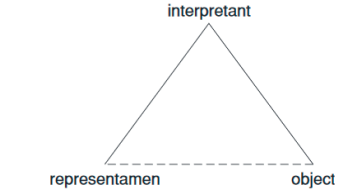
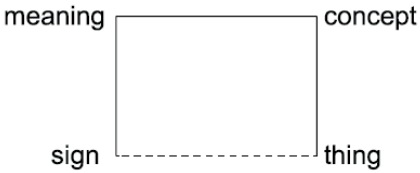


FIGURE 1.5 Peirce's semiotic triangle

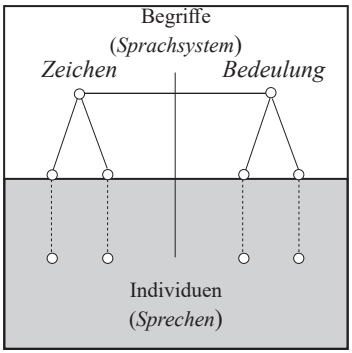
(Chandler, page 30, Image taken from http://www.wayanswardhani.lecture.ub.ac.id/files/2013/09/Semiotics-the-Basics.pdf)

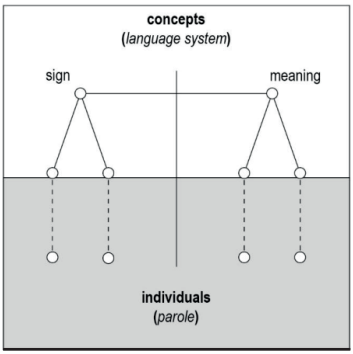
4. Quadrangles

a. Sematic Quadrangle by G. P. Melnikov (taken from (Wang, 2016)

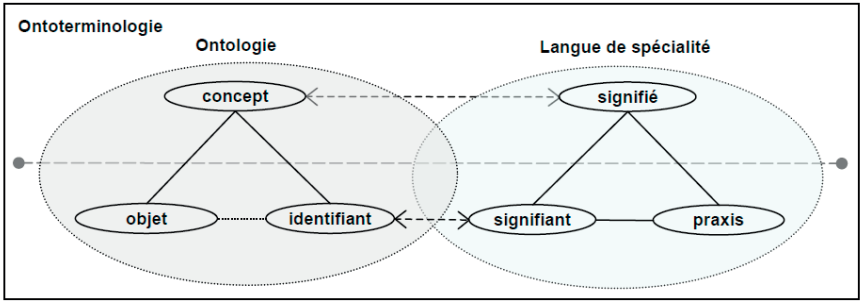


b. Semantic Quadrangle of Wüster (the original, on the left, as published in Wüster, 1959:308). The translation, on the right, taken from (Ivanović, 2020).



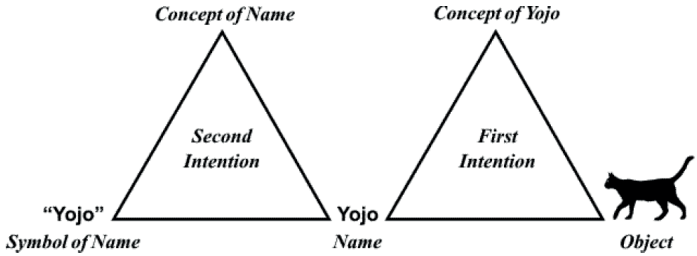


5. The double semantic triangle, by C. Roche (2007)



6. Combination of triangles, by J. Sowa (2010)

a. The "Scholastic Triangles" (Sowa, 2010: Figure 1)



b. (Peirce) concept of representation by means of two meaning triangles (Sowa, 2010: Figure 3)

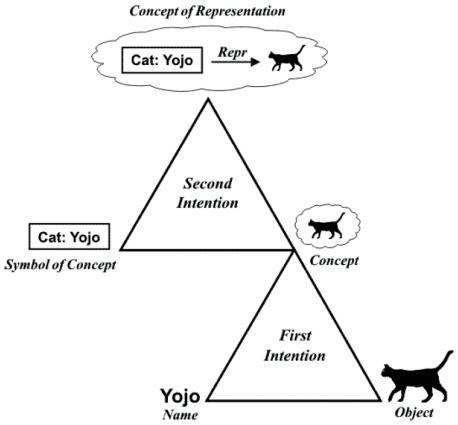
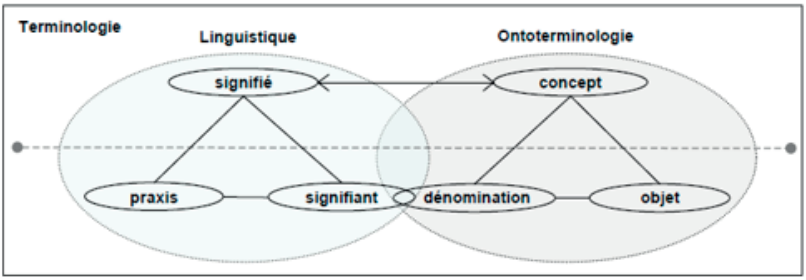


Figure 3. Meaning triangles for the concept of representation

7. The first version of the double semantic triangle, by C. Roche (2007)



Résumé

Des modèles graphiques sont souvent proposés à des fins de visualisation explicative pour différentes théories des signes, de la signification, des concepts ou des références. Nous décrivons notre travail portant sur la transformation de tels modèles graphiques en un langage de représentation formelle basé sur les graphes. L'objectif final de cette représentation formelle est de pouvoir marquer les éléments de ces différentes théories comme étant compatibles, complémentaires ou disjoints.