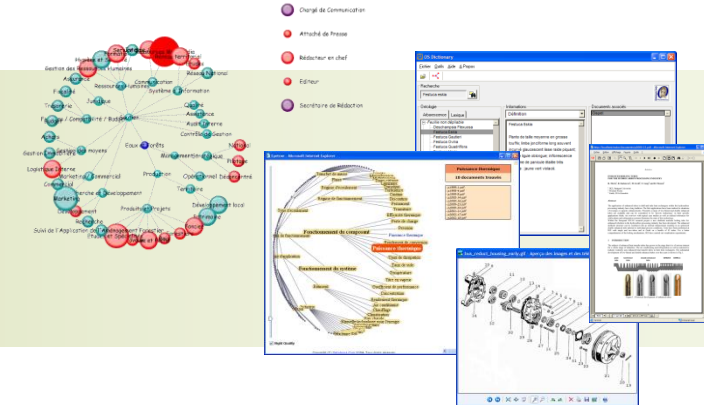
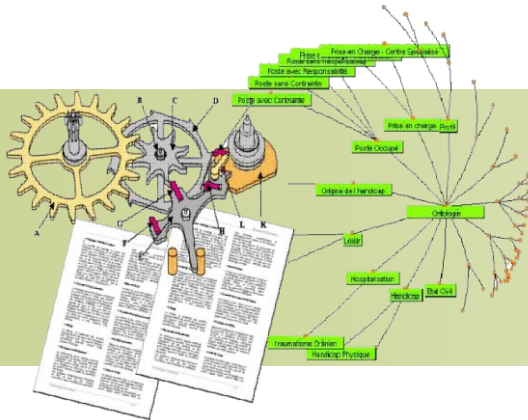


Synonymy in Terminology: The Contribution of Ontoterminology



Pr. Christophe Roche

Condillac Research Group « Knowledge Engineering »
University of Savoie - France

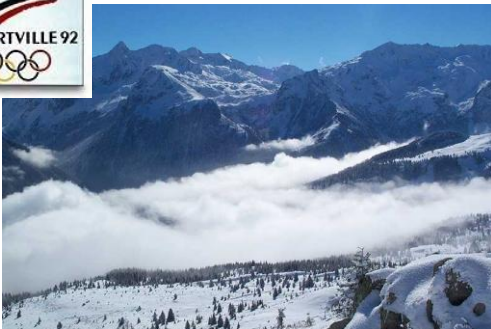
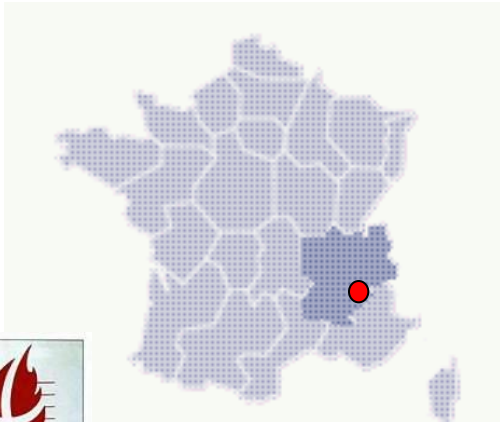
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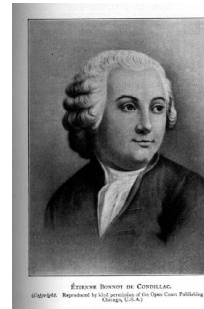
cell : +33 6 86 25 07 05
<http://ontology.univ-savoie.fr>

Condillac Research Group: “Knowledge Engineering”

<http://ontology.univ-savoie.fr>

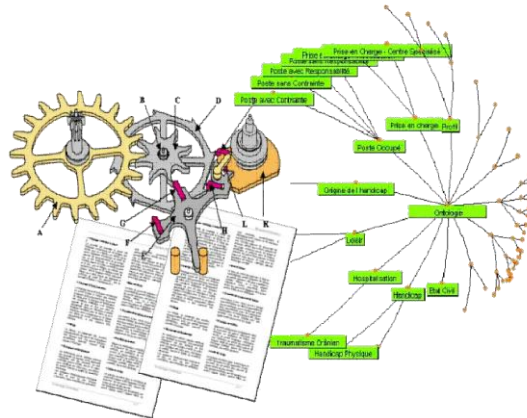
- **Terminology** (ISO 704)
- **Ontology**

Etienne Bonnot de Condillac (1714 - 1780) :



French Philosopher :

- Locke
- Essay about human knowledge
- Logic, Language



nature. Because words are the signs of our ideas, the system inherent in natural language must be based on the system inherent in our knowledge. Thus, languages have different types of words only because our ideas belong to different classes; they have means to connect ideas only because the only way we think is by connecting ideas (Condillac 1775: 27).



TOTh Conference

www.porphyre.org/toth

Ontology & Terminology: Theories and application

■ Content

Synonymy in Terminology: the contribution of Ontoterminology

1

□ Context

- *Industrial Applications*



□ Terminology

- *ISO 704*



□ Synonymy

- *synonymy in terminology*

2

□ Objectives

- *Standardization*

□ Ontoterminology

- *Ontology*

□ Conclusion

Context

Industrial Context

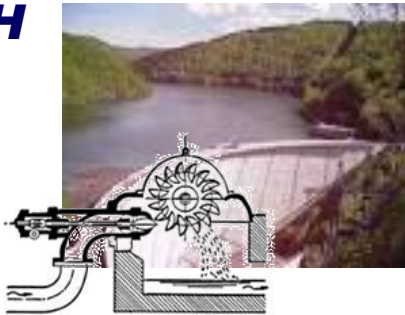
Onomia

www.onomia.com

EDF



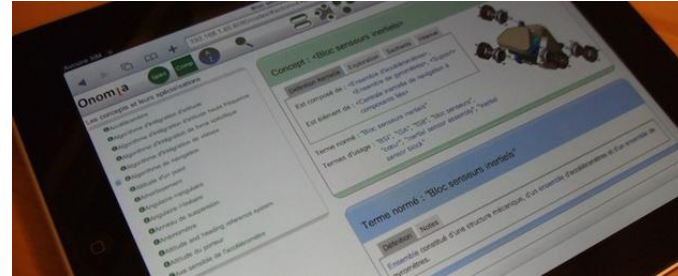
CIH



Turbine PELTON

Q petit N_s - 6 ... 60
 H grand n_s - 2 ... 20
 v - 0.01 ... 0.11

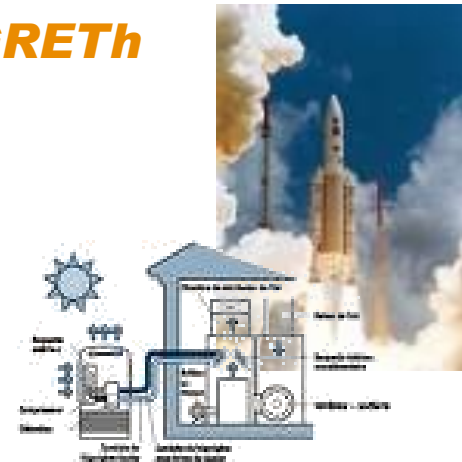
Onomia



Terminology
Ontology
Knowledge Mapping

- 1
- Context
- Terminology
- Synonymy

GRETh



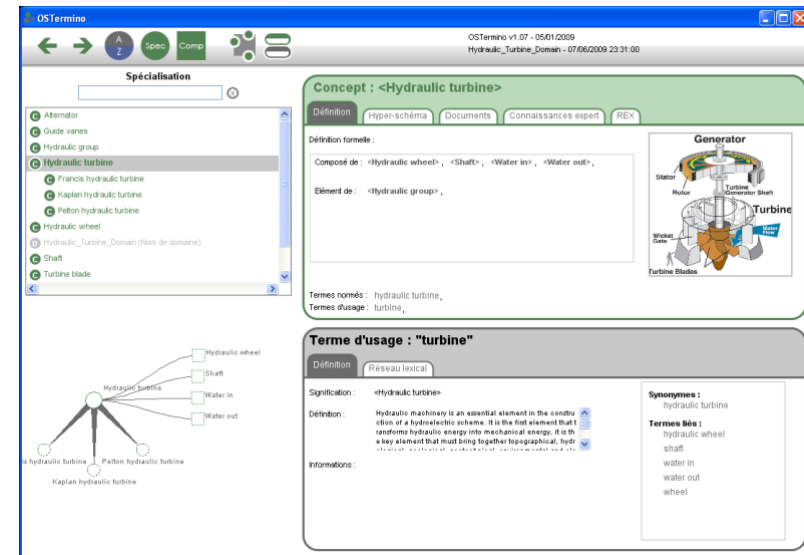
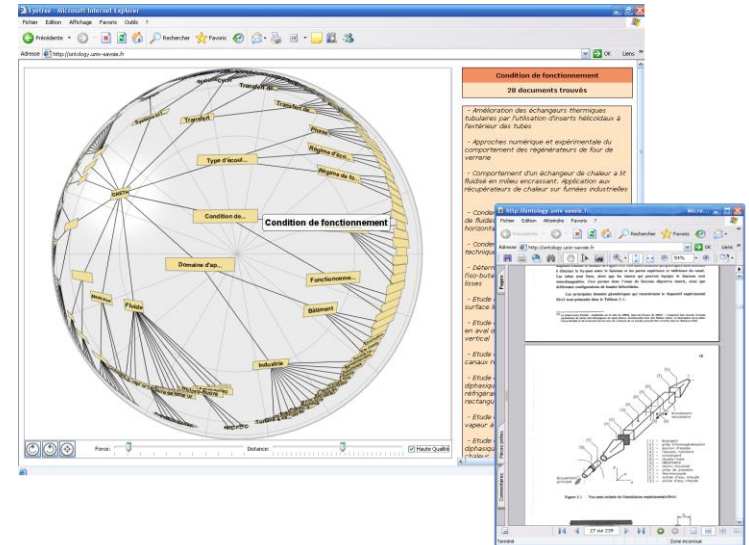
Context

Industrial Applications

- Specialized Dictionaries
- Knowledge Capitalization
- Knowledge Mapping
- e-Learning
- Content Management Systems
- Semantic Search Engine
- Semantic Web

⇒ Terminology

- Context
- Terminology
- Synonymy



Specialized Dictionary

- Context
- Terminology
- Synonymy

OSTermino v1.07 - 05/01/2009
Hydraulic_Turbine_Domain - 07/06/2009 23:31:00

Spécialisation

- Alternator
- Guide vanes
- Hydraulic group
- Hydraulic turbine**
 - Francis hydraulic turbine
 - Kaplan hydraulic turbine
 - Pelton hydraulic turbine
- Hydraulic wheel
- Hydraulic_Turbine_Domain (Nom de domaine)
- Shaft
- Turbine blade

Concept : <Hydraulic turbine>

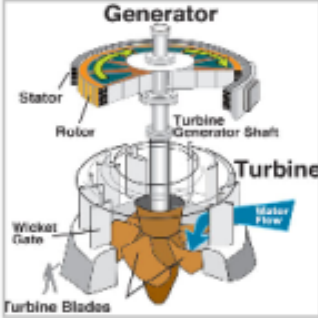
Définition | Hyper-schéma | Documents | Connaissances expert | REX

Définition formelle :

Composé de : <Hydraulic wheel> , <Shaft> , <Water in> , <Water out> ,

Élément de : <Hydraulic group> ,

Termes normés : hydraulic turbine ,
Termes d'usage : turbina ,



Terme d'usage : "turbine"

Définition | Réseau lexical

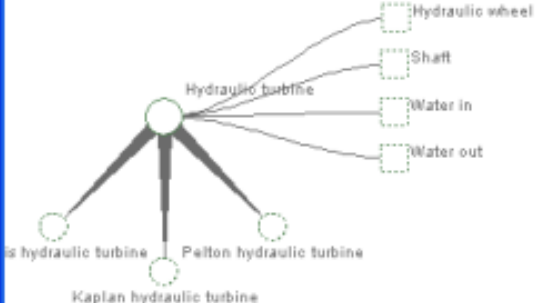
Signification : <Hydraulic turbine>

Définition : Hydraulic machinery is an essential element in the construction of a hydroelectric scheme. It is the first element that transforms hydraulic energy into mechanical energy, it is the key element that must bring together topographical, hydraulic and economic aspects of hydroelectricity.

Informations :

Synonymes :
hydraulic turbine

Termes liés :
hydraulic wheel
shaft
water in
water out
wheel



Denotative

Connotative

Ontoterminology

■ Terminology

1

- Context
- Terminology
- Synonymy



■ Definition

□ ISO 1087-1

Terminology

“set of **designations** belonging to one **special language**”

Designation

“representation of a **concept** by a sign which denotes it”

Special language

“language used in a **subject field** and characterized by the use of specific linguistic means of expression”

Concept

Term

“verbal **designation** of a **general concept** in a specific **subject field**”

Concept

“unit of knowledge created by a unique combination of **characteristics**”

Knowledge

Subject field

“field of special knowledge”

■ Terminology



1

- Context
- Terminology
- Synonymy

■ Objective

□ ISO 704

“The terminology work dealt with in this International Standard is concerned with terminology used for **unambiguous communication** in natural, human language. The goal of terminology work as described in this International Standard is, thus, a clarification and **standardization** of concepts and terminology for communication between humans.”

■ **Terminology**



1

- Context
- Terminology
- Synonymy

■ **Comments**

- Terminology **is not** a specialized lexicography
- Terminology imposes a **prescriptive** approach
- Terminology has **2 dimensions**: - conceptual
- linguistic
- Terminology follows an **onomasiological** approach

■ **Synonymy**

■ **Definitions**

▣ **Synonymy**

“Expressions with the same meaning are synonymous” [Lyons]

▣ **Near-synonymy**

“expressions that are more or less similar, but not identical, in meaning” [Lyons]

▣ **Denotative *versus* Connotative**

Words can vary along two dimensions:

- denotative (semantics)
- connotative (stylistic)

■ **Synonymy**

1

- ▣ Context
- ▣ Terminology
- ▣ Synonymy

■ **Synonymy in Terminology**

- ▣ Principles of the GTT (General Theory of Terminology)
- ▣ Standardization
- ▣ Bi-univocity
 - a term denotes one concept: **monosemy**
 - a concept is denoted by only one term: **mononymy**

⇒ **No synonymy in terminology**

The terminology world is marvellous



■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

■ Standardization

- ❑ Unambiguous communication
- ❑ Help for understanding and writing technical documents
- ❑ Quality assessment of technical documents
- ❑ Training, e-Learning
- ❑ Specialized Dictionary
- ❑ ...

⇒ Removing synonyms

Defining (imposing) standardized terms

Such an approach does not work



■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

■ *There are synonyms (polysemes) in terminology*

There are *absolute* synonyms in terminology



“Relais tout ou rien” \equiv “Relais TOR”
 (“on-off relay”)

“voltage threshold relay” \equiv “voltage relay”

“Relais tout-ou-rien bistable” \equiv “Relais bistable”
 (“on-off bistable relay”)

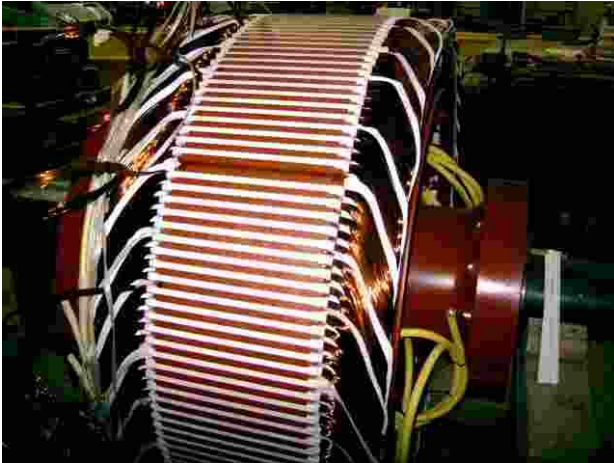
■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

- ***There are synonyms (polysemes) in terminology***

There are *absolute* synonyms in terminology



“jante massive soudée” ≡ “jante soudée”

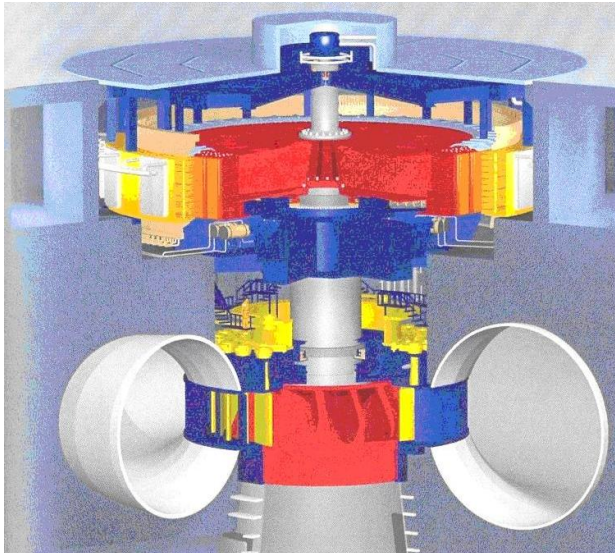
■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

- *There are synonyms (and polysemes) in terminology*

There are near-synonyms in terminology



“turbine” \cong “wheel”

■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

- *Some normalized terms are never used*

“**voltage threshold relay**” ≡ “**voltage relay**”

“**jante massive soudée**” ≡ “**jante soudée**”

If synonymy can not be avoided...

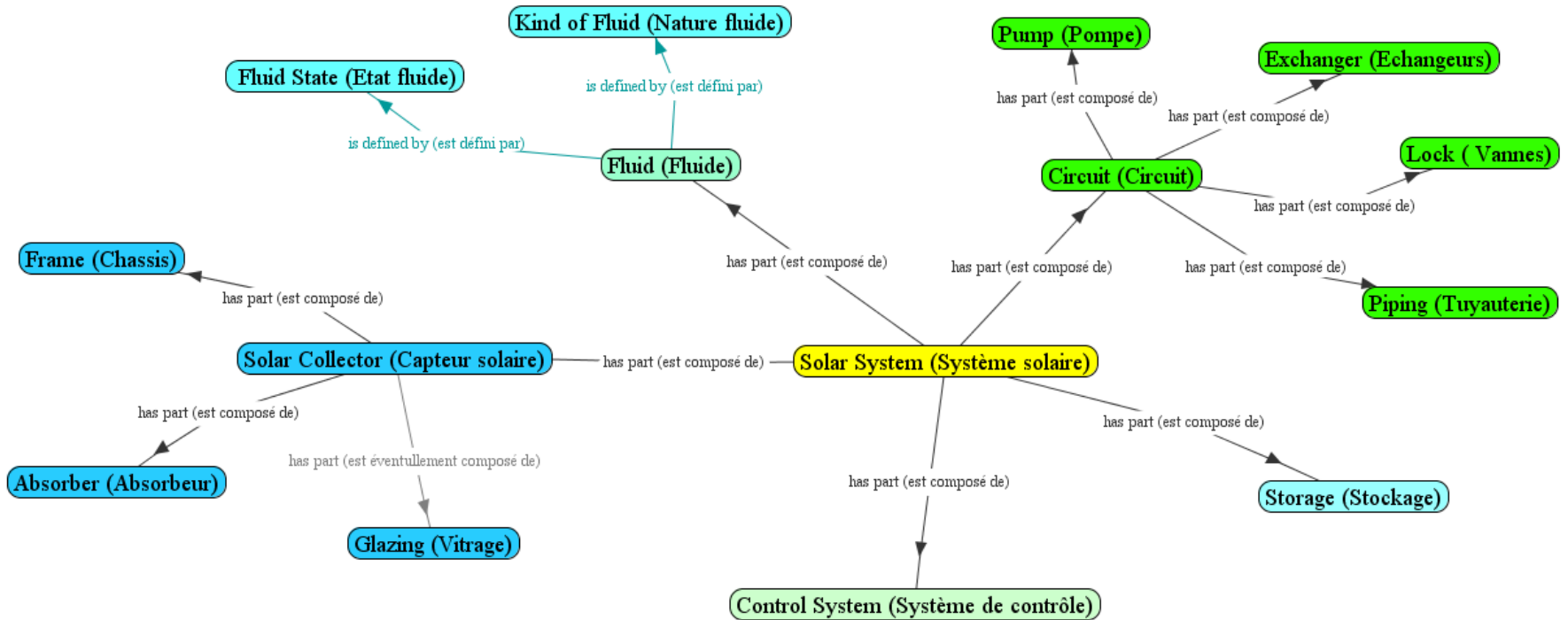
Objectives

2

- Objectives
- Ontoterminology
- Conclusion

Synonymy must be explained...

... from the domain knowledge point of view...



■ Objectives

2

- ❑ Objectives
- ❑ Ontoterminology
- ❑ Conclusion

■ *Synonymy must be explained...*

... from the linguistic point of view

“Relais tout ou rien” ≡ “Relais TOR” (“on-off relay”)

terminological variation

“jante massive soudée” ≡ “jante soudée”

ellipsis

“Relais tout-ou-rien bistable” ≡ “Relais bistable” (“on-off bistable relay”)

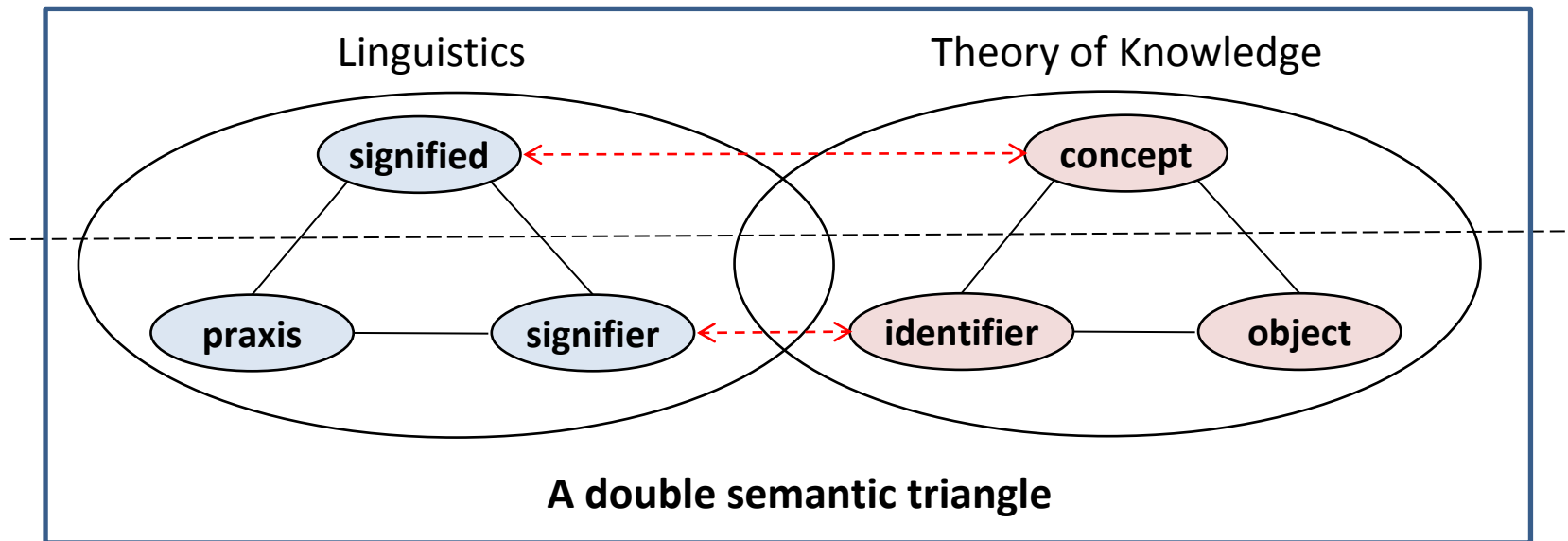
“turbine” ≅ “wheel”

metonymy

■ *A definition of (near-) synonymy in terminology*

▣ **Signified versus Concept**

- Synonymy is a linguistic relationship built in discourse;
- Synonymy is defined in relation to word sense (meaning);
- A term in discourse is used as a word and then has a signified.



■ Ontoterminology

2

- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ *A definition of (near-) synonymy in terminology*

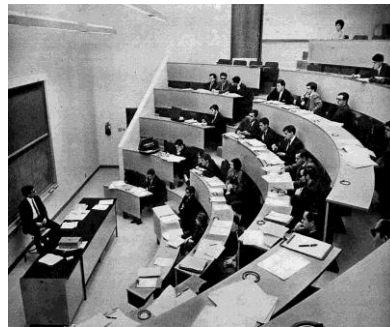
- ▣ A signified is not a concept
- ▣ A concept is language-independent
- ▣ A term (designation, signifier) is not a denomination (identifier)
- ▣ Two dimensions: Conceptual and Linguistic

⇒ There are two different semiotic systems which do not match

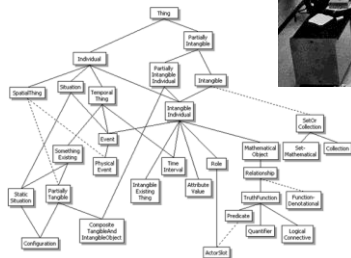
Saying

is not

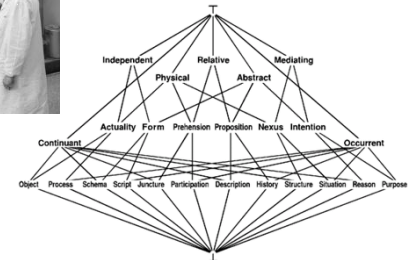
Modelling



Lexical network



Conceptual network



■ **Ontoterminology**

2

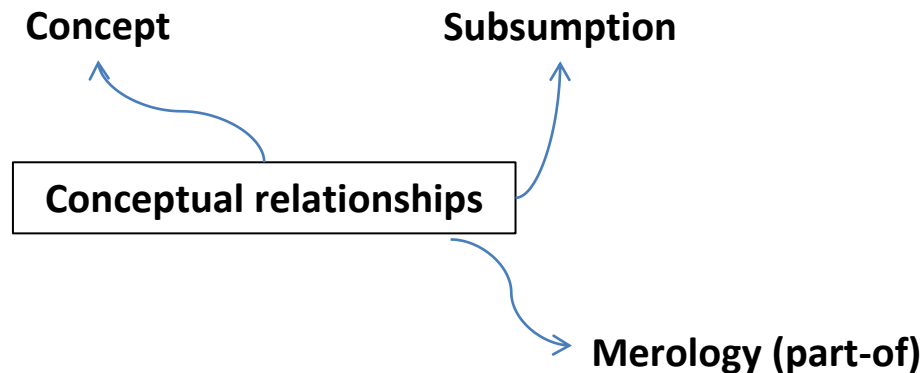
- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ **A definition of (near-) synonymy in terminology**

2 terms are (near-) synonymous from a terminological point of view (i.e. independently of any discourse) if and only if they denote the same concept.

Onomasiological approach

⇒ **Conceptual relationships must-should-can explain synonymy**



⇒ **Representation of the conceptual system**

Ontoterminology

- 2
- Objectives
- Ontoterminology
- Conclusion

Ontology

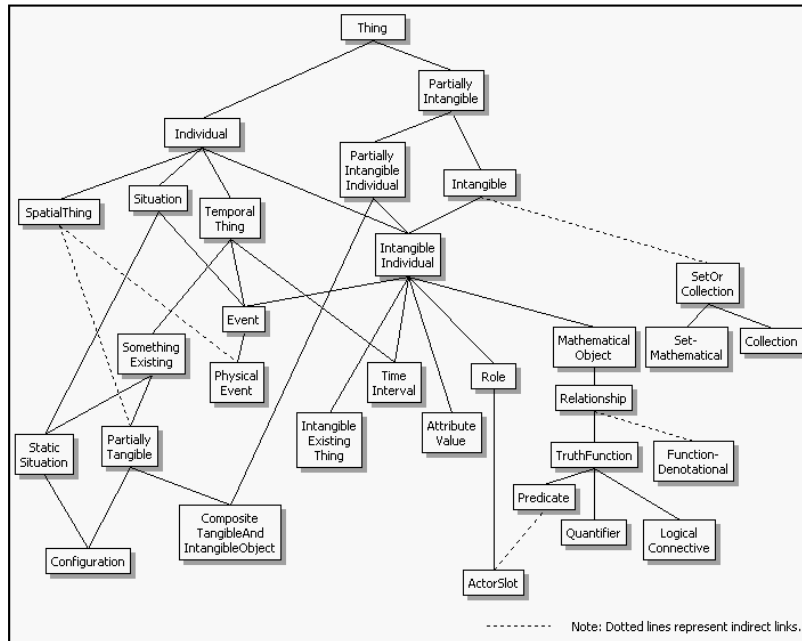
“the branch of metaphysics dealing with the nature of being”



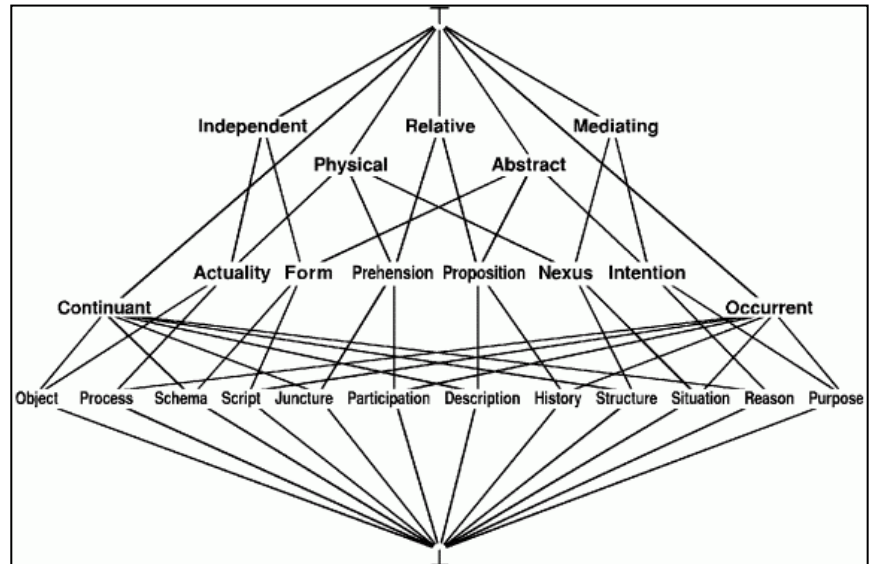
“An ontology is a specification of a conceptualization” *Tom Gruber*

“An ontology is a shared description of concepts and relationships of a domain expressed in a formal (computer readable) language” C.Roche

Upper Cyc



KR Sowa

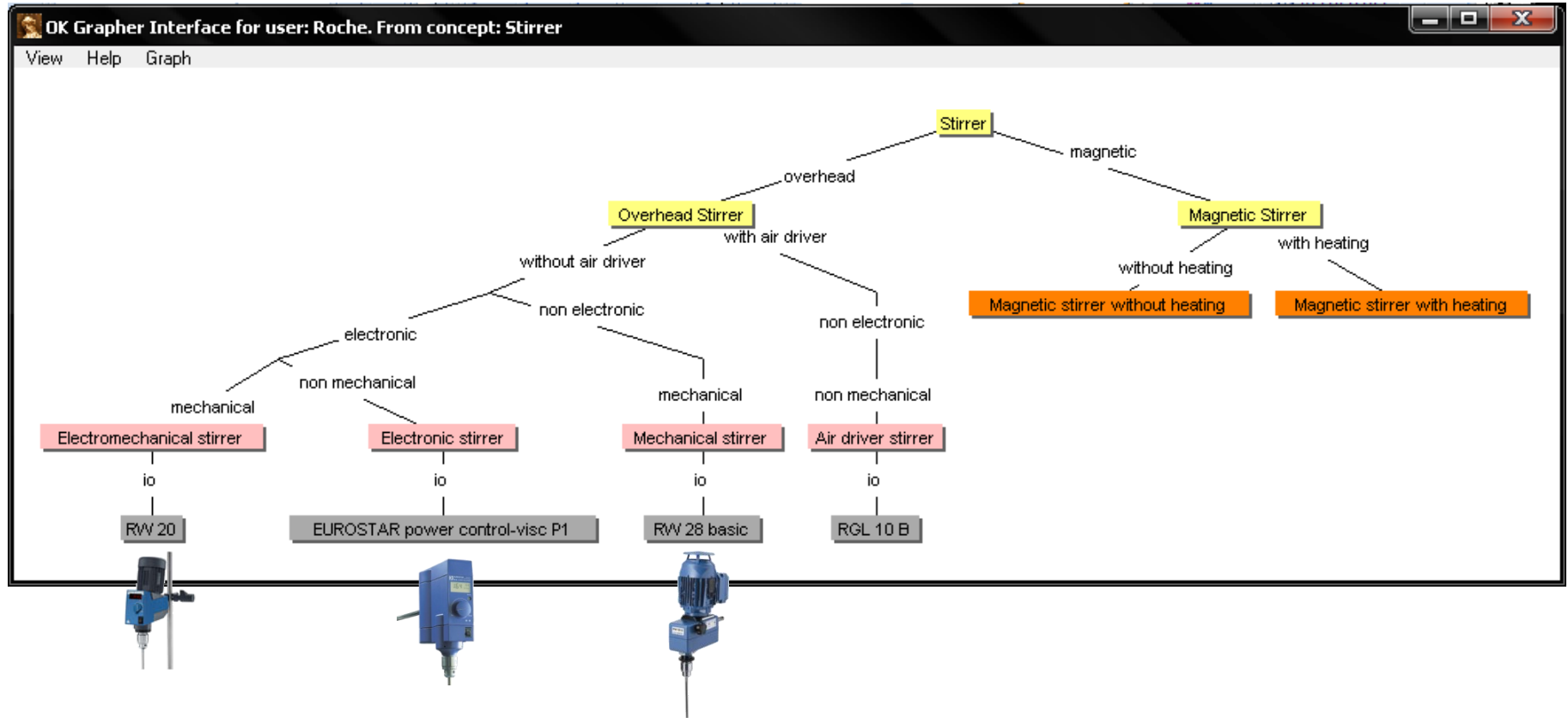


■ Ontoterminology

2

- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ Ontology



- ▣ The choice of the formal language is important
- ▣ Epistemological principles

■ **Ontoterminology**

2

- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

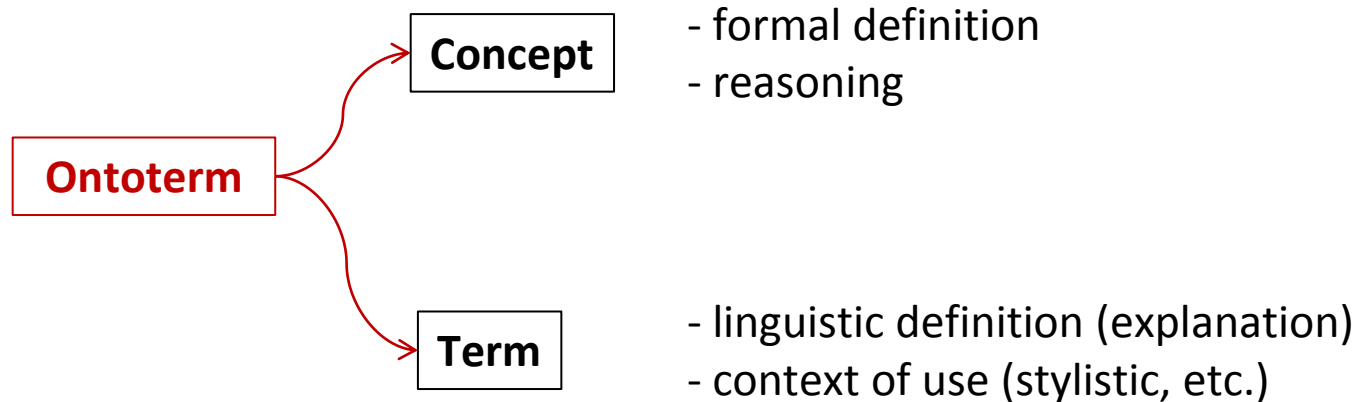
■ **Ontoterminology**

▣ **Unifies ontology and terminology**

▣ **Focuses on concept**

- a concept does not represent the meaning of a term but a domain knowledge
- terms speak about domain knowledge

▣ **The double semantic triangle**



■ Ontoterminology

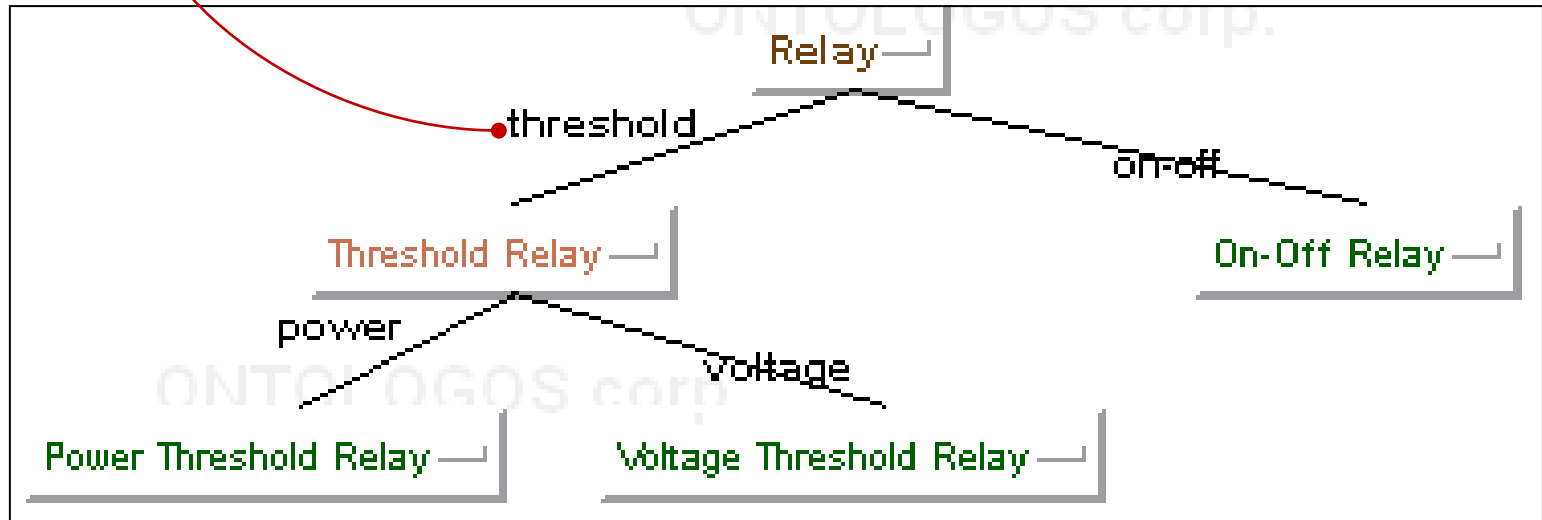
2

- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ (near-) synonymy , polysemy

ellipsis

“voltage threshold relay” ≡ “**voltage relay**”



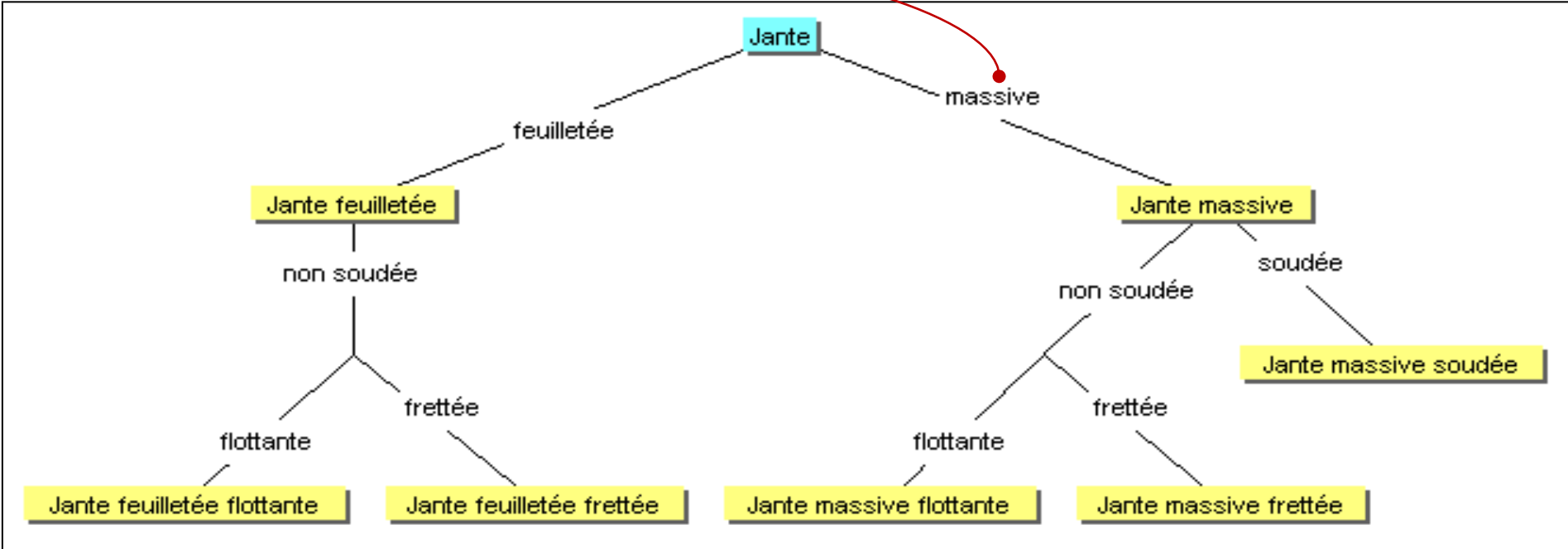
■ Ontoterminology

- 2
- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ (near-) synonymy , polysemy

ellipsis

“jante massive soudée” ≡ “**jante soudée**”



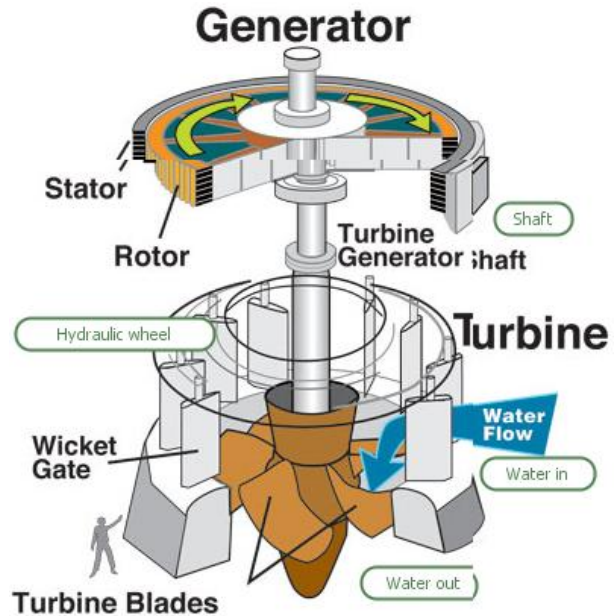
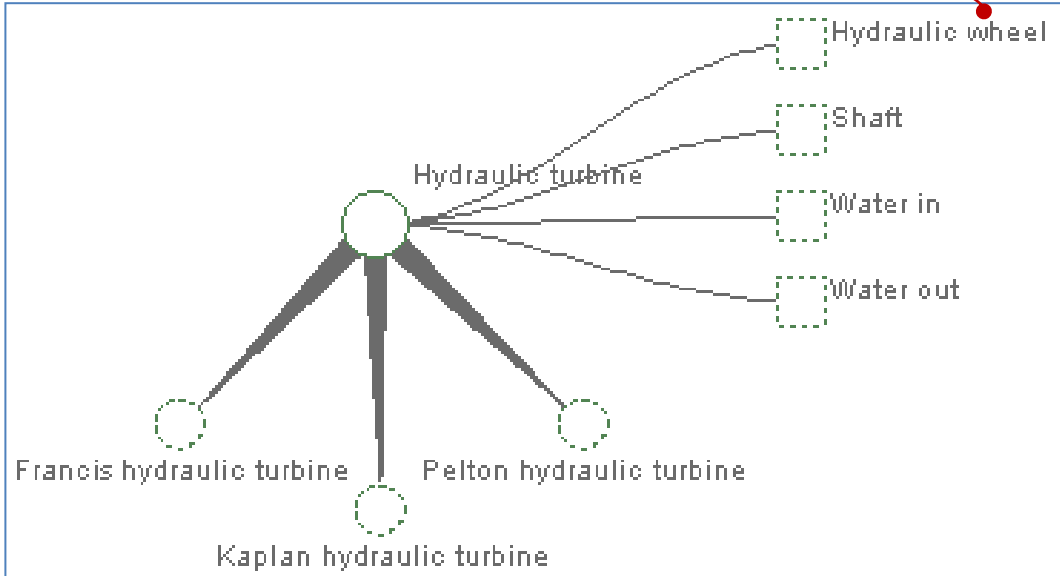
■ Ontoterminology

- 2
- ▣ Objectives
- ▣ Ontoterminology
- ▣ Conclusion

■ (near-) synonymy , polysemy

metonymy

“turbine” \cong “wheel”



Specialized Dictionary

- 2
- Objectives
- Ontoterminology
- Conclusion

OSTermio v1.07 - 05/01/2009
Hydraulic_Turbine_Domain - 07/06/2009 23:31:00

Spécialisation

Term list

- Alternator
- Hydraulic turbine
 - Francis hydraulic turbine
 - Kaplan hydraulic turbine
 - Pelton hydraulic turbine
- Hydraulic wheel
- Hydraulic_Turbine_Domain (Nom de domaine)
- Shaft
- Turbine blade

Concept : <Hydraulic turbine>

Formal definition

Définition formelle :

Composé de : <Hydraulic wheel> , <Shaft> , <Water in> , <Water out> ,

Élément de : <Hydraulic group> ,

Generator

Turbine

Termes només : hydraulic turbine,
Termes d'usage : turbine,

Term card

Terme d'usage : "turbine"

Linguistic explanation

Signification : <Hydraulic turbine>

Définition : Hydraulic machinery is an essential element in the construction of a hydroelectric scheme. It is the first element that transforms hydraulic energy into mechanical energy, it is the key element that must bring together topographical, hydraulic and mechanical aspects.

Informations :

Synonymes :
hydraulic turbine

Termes liés :
hydraulic wheel
shaft
water in
water out
wheel

Ontology

Interactive browser

■ **Conclusion**

■ ***Why synonymy in terminology?***

- ▣ Natural language is not a formal language

⇒ rhetorical figures are common in LSP: ellipsis, metonymy

■ ***Synonymy is a linguistic expression of conceptual relationships***

■ ***Ontoterminology***

- ▣ Unifies the two dimensions of terminology
- ▣ The double semantic triangle

■ ***Perspectives***

- ▣ A term conveys more than its denoted concept

⇒ linguistic dimension: - context of use (stylistic, sociolinguistic...)
- corpus studies