COMPUTATIONAL LEXICOGRAPHY
from traditional dictionaries to automated lexicon

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Resúmen

For twenty years, computarized procesing in Linguistics has been leading to the creation of a new research field: Computational Linguistics.

Lexicon, syntax and semantics have been the subject of a large research effort. Whitin the wider context of Language Industries, dictionaries play a fundamental role as obligatory component of any system: speech understanding, speech recognition, text processing and advanced office systems, computerized publishing, text generation systems, natural language interfaces, computer aided translation,... use information stored in dictionaries dedicated to the specific needs of these applications. It is now possible to consider Computational Lexicography as a research and development field by itself.

A dictionary is a human artifact: thus is is subject to errors and inconsistencies. Various mathematical techniques can be used to solve these problems, the computer being the ideal tool.

It is fundamental to be able to:

-improve the ready-made dictionary contents.

-modelize the various lexicographical information.

-highlight the structural problems of these basic dictionaries

-check, disambiguate and correct the contents in order to use the dictionaries with a computer.

-obtain easily interpretable results to update dictionaries.

Some processing on monoligual and bilingual dictionaries will be presented. They have been realised using a new mathematical method called Quadri-decomposition, recently developed at the IBM-France Paris Scientific Center.

COMPUTATIONAL LEXICOGRAPHY

From traditional dictionaries

to

automated lexicons

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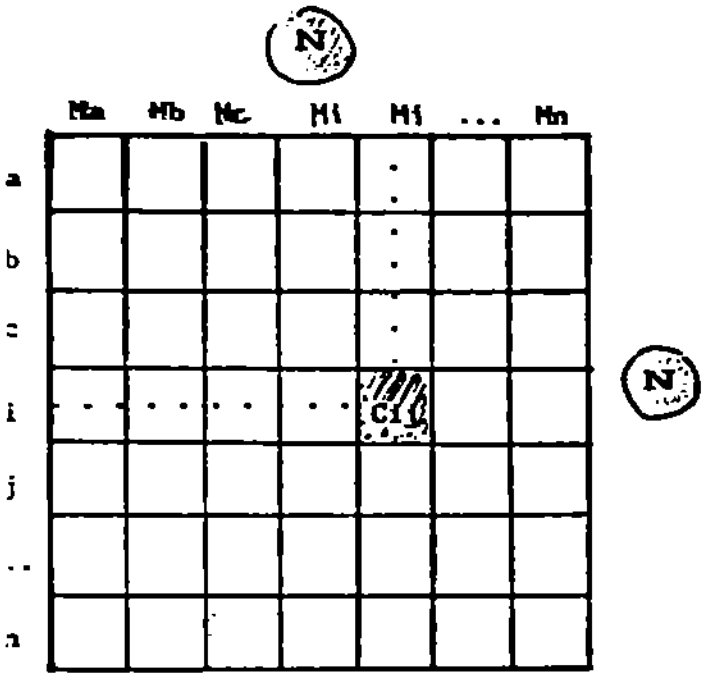
RELATIONAL AGGREGATION

DICTIONARY / DICTIONARIES

NON-LANGUAGE DEPENDENT APPROACH



SYNONYMS

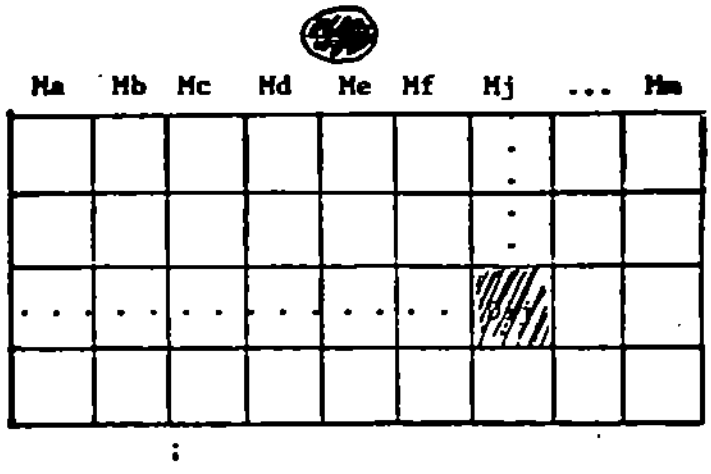
Cij = 1 if Mj is given as synonym with Mi

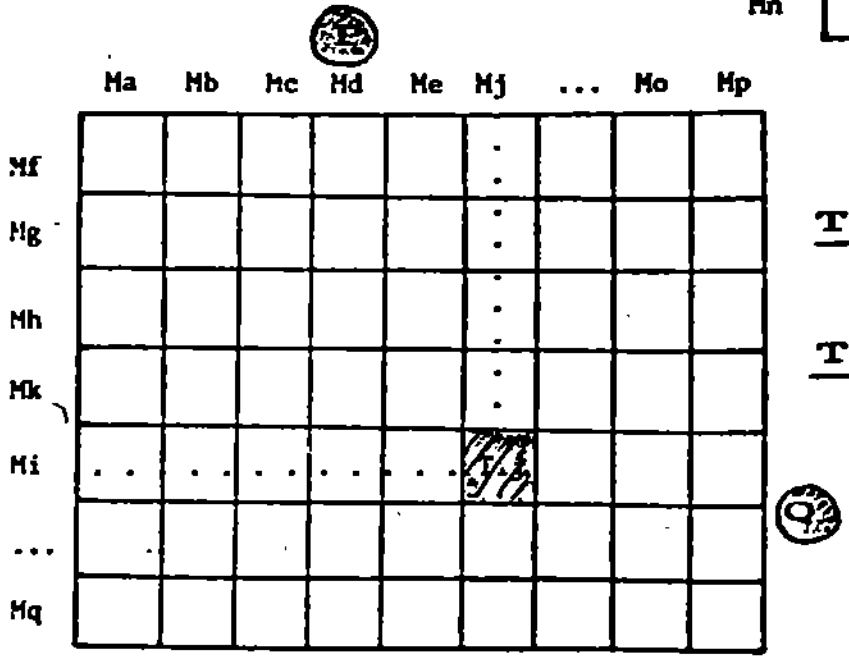
Cij = 0 if not.

DEFINITIONS

Dij = 1 if Mj is in the definition of Mi

Dij = 0 if not





Tij = 1 if Mj is given as translation Mi

Tij = 0 if not

TRANSLATION

DICTIONARY OF SYNONYMS

optimization : a need

- ***in Advanced Text Processing Systems***
  - small clusters
  - semic separate valuation
  - hierarchical thesaurus

- ***in Traditional Dictionaries***
  - extensive clusters
  - mixing of meanings
  - no hierarchical organization

BON

sensible

important

suffisant

passable

mediocre

MAUVAIS

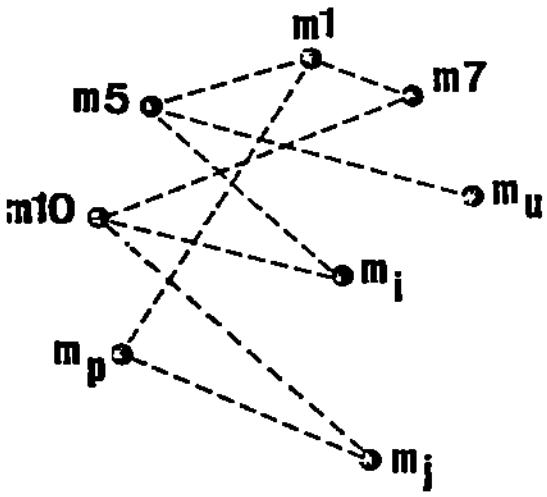
chaland:n
client.
chalandise:n
clientèle.
chalet d'aisance:n
cabinets.
chalet de nécessité:n
cabinets.
chaleur:n
<pr>
canicule, étuve, fournaise, touffeur;
<fig>
amour, animation, ardeur, coeur, cordialité, élan, empressement, énergie, enthousiasme, entrain, exaltation, excitation, ferveur, feu, fièvre, flamme, fougue, frénésie, impétuosité, lyrisme, passion, passion, véhémence, verve, vigueur, vivacité, zèle.
chaloir:v
<vx>
intéresser.
chamade:n
<vx>
appel.
chamailleur:n
disputailleur, querelleur.
chamaillis:n
<vx>
dispute, échauffourée.
chamarré:j
bariolé.
chamboulement:n
chambardement (fam).
champ de foire:n
foirail, marché.
champ de repos:n
cimetière.
champ des morts:n
<litt>
champ du repos, cimetière.
champignonner:v
<fam>
proliférer, pulluler.
championnat:n
compétition, coupe.
changement:n
altération, conversion, évolution, métamorphose, modification, mue, mutation, refonte, réformation, réforme, remaniement, transformation, variation;
bouleversement, renversement, retournement, revirement, révolution;
alternance, échange, remplacement, substitution, troc;
<fig>
innovation, mouvement, nouveauté, variété;
remplacement, renouvellement, rénovation.
changer de crémerie:v
<arg>
déménager, mettre les bouts (arg), mettre les voiles (arg).
changer:vp
évoluer, se convertir, se modifier, se retourner, se transformer, tourner bride, varier, virer.

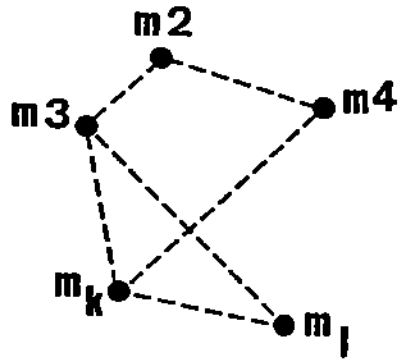
beau:j
<qqun>
- gracieux, joli, mignon, ravissant, séduisant;
- magnifique, merveilleux, splendide, sublime, superbe;
- accompli, achevé, brillant, consommé, cultivé,
éminent, fameux,
formidable, grand, haut, magistral, supérieur;
- admirable, digne, estimable, généreux, honn + te,
honorable, juste, magnanime, noble, vertueux;
- émouvant, touchant;
- agréable, charmant, gentil, plaisant, séduisant;
<qqch>
- émouvant, touchant;
- adroit, astucieux, habile;
- chic, choisi, élégant, sélect;
- gracieux, harmonieux, joli, mignon;
- esthétique, sculptural;
- magnifique, merveilleux, ravissant, splendide, sublime, superbe;
- fameux, formidable, grand, haut, magistral, parfait, supérieur;
- avantageux, fructueux, lucratif;
- florissant, prospère, riche;
- considérable, énorme, fort, gros, important, imposant;
- intéressant, passionnant;
- adéquat, approprié, bon, heureux;
- agréable, charmant, plaisant, séduisant.

beau01:j
<qqun06>
gracieux00, joli00, mignon00, ravissant00, séduisant00.
beau02:j
<qqun06>
magnifique00, merveilleux00, splendide00, sublime00, superbe00.
beau03:j
<qqun06>
accompli00, achevé00, brillant00, consommé00,
cultivé00, éminent00, fameux00,
formidable00, grand00, haut00, magistral00,
supérieur00.
beau04:j
<qqun06>
admirable00, digne00, estimable00, généreux00, honn + te00,
honorable00, juste00, magnanime00, noble00, vertueux00.
beau05:j
<qqun06>
émouvant00, touchant00.
beau06:j
<qqun06>
agréable00, charmant00, gentil00, plaisant00, séduisant00.
beau07:j
<qqch13>
émouvant00, touchant00.
beau08:j
<qqch13>
adroit00, astucieux00, habile00.
beau09:j
<qqch13>
chic00, choisi00, élégant00, sélect00.
beau10:j
<qqch13>
gracieux00, harmonieux00, joli00, mignon00.
beau11:j
<qqch13>
esthétique00, sculptural00.
beau12:j
<qqch13>
magnifique00, merveilleux00, ravissant00, splendide00, sublime00,
superbe00.
beau13:i

SYNONYMICAL CONNECTED COMPONENTS

Decomposition of the problem

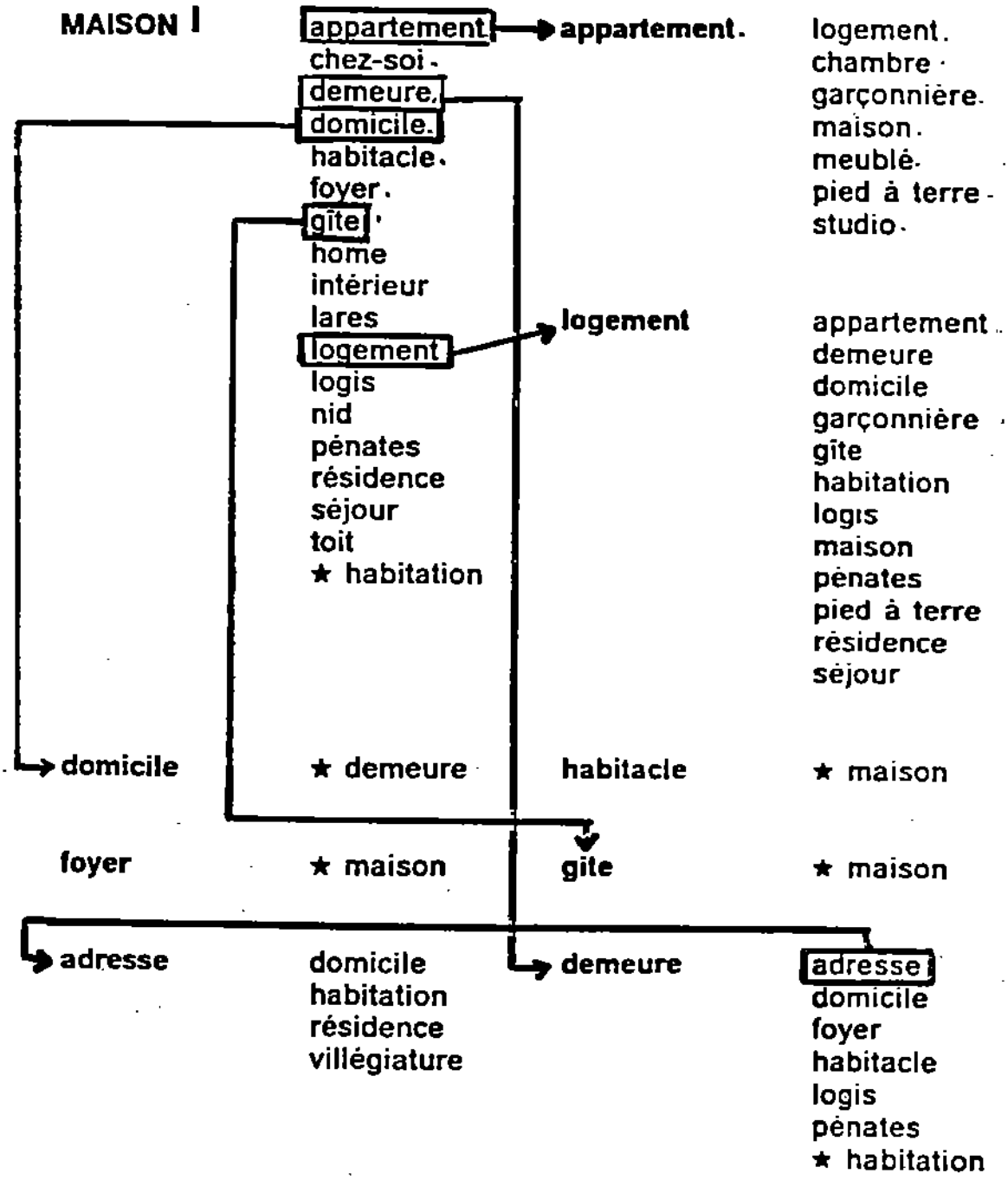




	m1	m5	m7	m10	mi	mj	mu	mr
m1	1	1	1	0	0	0	0	1
m5	1	1	1	0	0	1	0	1
m7	1	0	1	1	0	0	1	0
m10	0	0	1	1	1	1	0	0
mi	0	1	0	1	1	1	0	0
mj	0	0	0	1	1	1	0	1
mu	0	1	1	0	0	0	1	0
mr	1	0	0	0	0	1	0	1

	m2	m3	m4	mk	ml
m2	1	1	1	0	0
m3	1	1	0	1	1
m4	1	0	1	1	0
mk	0	1	1	1	1
ml	0	1	0	1	1

SEARCH OF CONNECTED COMPONENTS



RAW DATA MATRIX

	Maison	Appartement	Chez-soi	Demeure	Domicile	Habitacle	Foyer	Gîte	Home	Intérieur	Lares	Nid	Pénates	Résidence	Séjour	Toit	Chambre	Garçonnière	Habitation	Logement	Pied-à-terre	Meublé	Studio	Adresse	Logis	Abri	Refuge	Siège	Endroit	Retraite	Villégiature	Hôtel	Relais	Hôtel
Maison	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Appart.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Chez-soi	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Demeure	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Domicile	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Habitac.	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Foyer	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gîte	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Home	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intérieur	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Lares	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Nid	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Pénates	1	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Résidence	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Séjour	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Toit	1	1	1	1	1	0	0	1	1	0	0	1	0	1	1	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Chambre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Garçonn.	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Habitat.	1	1	1	1	1	0	0	1	1	0	0	1	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Logement	1	1	0	1	1	0	0	1	0	0	0	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Pied-à-t.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Meublé	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Studio	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Adresse	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Logis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Refuge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Siège	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endroit	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retraite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Villégia.	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Motte	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
Relais	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hotel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0

EXAMPLE

C

	A	B	C	D	E	F
A	1	1	1	0	1	0
B	1	1	1	0	0	1
C	1	1	1	0	1	0
D	0	0	0	1	0	1
E	1	0	1	0	1	0
F	0	1	0	1	0	1

Y

	A	B	C	D	E	F
A	1	1	1	0	1	0
B	1	1	1	0	1	0
C	1	1	1	0	1	0
D	0	0	0	1	0	1
E	1	1	1	0	1	0
F	0	0	0	1	0	1

class 1

class 2

	A	B	C	E	D	F
A	1	1	1	1	0	0
B	1	1	1	0	0	1
C	1	1	1	1	0	0
E	1	0	1	1	0	0
D	0	0	0	0	1	1
F	0	1	0	0	1	1

C matrix permuted according to Y

- A1 *Internal adjustments*
- A2 *External ajustements*
- E1 *Internal errors*
- E2 *External errors*

THE MODEL

⇨ ★ Max (A1 + A2)

$$Max \sum_{i=1}^{n} \sum_{j=1}^{n} \left[C_{ij} Y_{ij} + \bar{C}_{ij} \bar{Y}_{ij} \right]$$

- **Y** being a partition

- Reflexivity
- Symmetry
- Transitivity

$$\begin{cases} Y_{ii} = 1 \\ Y_{ij} = Y_{ji} \\ Y_{ij} + Y_{jk} - Y_{ik} \leq 1 \end{cases}$$

or

⇨ ★ Min (E1 + E2)

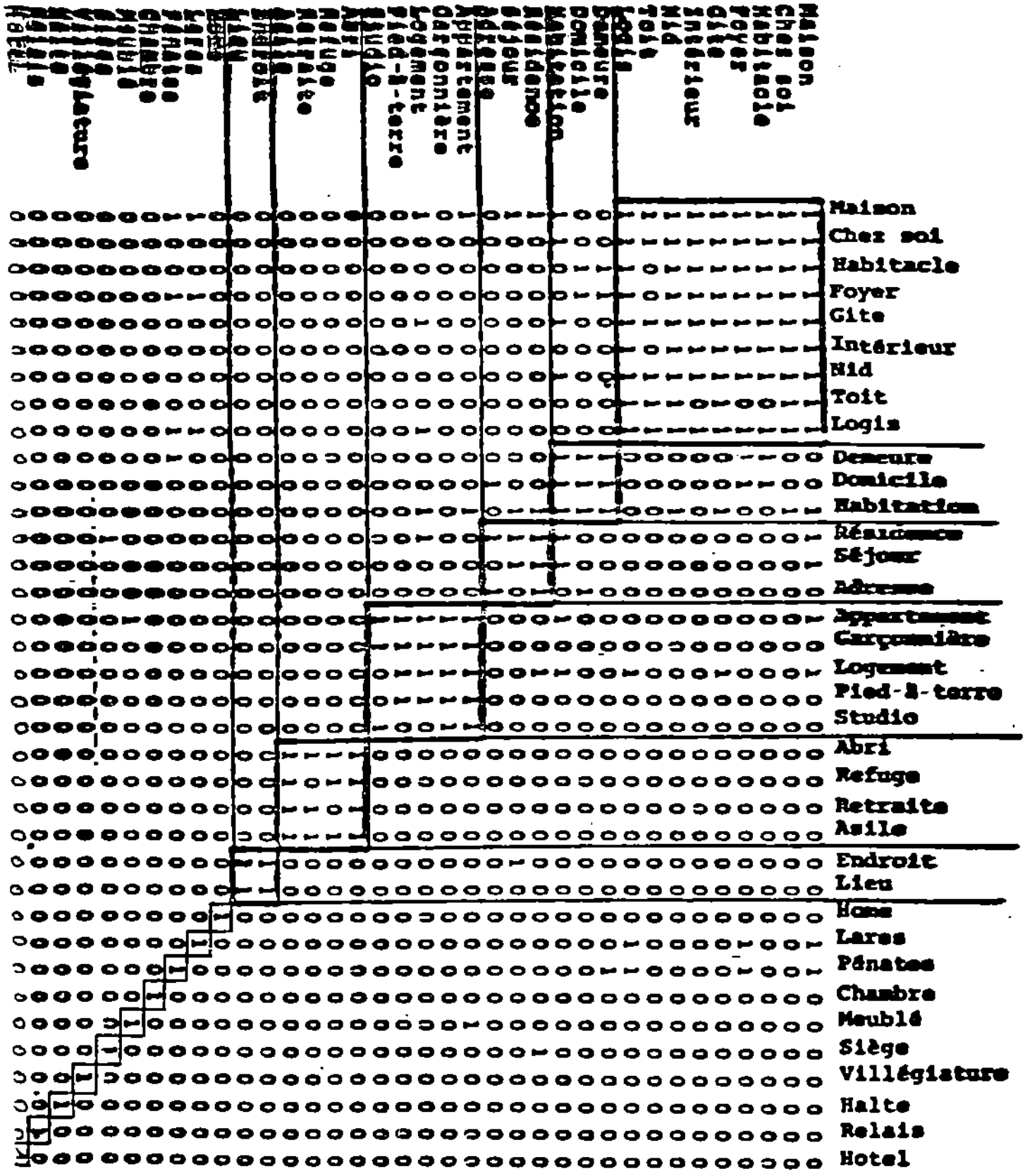
$$Min \sum_{i=1}^{n} \sum_{j=1}^{n} \left[\bar{C}_{ij} Y_{ij} + C_{ij} \bar{Y}_{ij} \right]$$

- **Y** being a partition

- Reflexivity
- Symmetry
- Transitivity

$$\begin{cases} Y_{ii} = 1 \\ Y_{ij} = Y_{ji} \\ Y_{ij} + Y_{jk} - Y_{ik} \leq 1 \end{cases}$$

C TABLEAU PERMUTED ACCORDING TO THE OPTIMAL PARTITION Y



RESULTING OPTIMAL PARTITION

Class 1
maison
nid
toit
habitation
logis
intérieur
habitacle
gîte
chez-soi
foyer

Class 2
pension
palace
meublé
garni
auberge
hotel

Class 3
studio
pied-à-terre
logement
garçonnière
appartement

Class 4
emplacement
endroit
site
position
lieu
situation

Class 5
résidence
siège

Class 6
séjour
villégiature

Class 7
demeure
domicile

Class 8
lares

Class 9
adresse

Class 10
place

Class 11
pénates

CLUSTERS REPRESENTATIVES

**** ANALYSE PAR MOT (EN %) ****

VENTILATION PAR CLASSE

		LIENS CREES+DETRUITS	LIENS CREES	LIENS DETRUITS
CLASSE 1				
• •	1 PENSION	0.00	0.00	0.00
• •	2 PALACE	0.00	0.00	0.00
• •	3 MEUBLE	0.00	0.00	0.00
• •	4 GARNI	0.00	0.00	0.00
• •	5 AUBERGE	0.00	0.00	0.00
➡	6 HOTEL	2.78	0.00	3.23
CLASSE 2		CREES+DETRUITS	CREES	DETRUITS
• •	26 GARCONNI	0.00	0.00	0.00
› ●	8 PIED-A-T	2.78	25.00	0.00
‹ ●	7 STUDIO	5.56	50.00	0.00
➡	27 APPARTEM	5.56	0.00	6.25
●	25 LOGEMENT	16.67	25.00	15.63
CLASSE 3		CREES+DETRUITS	CREES	DETRUITS
• •	9 SIEGE	0.00	0.00	0.00
➡	19 RESIDENC	13.89	0.00	14.29
CLASSE 4		CREES+DETRUITS	CREES	DETRUITS
• •	10 VILLEGIA	0.00	0.00	0.00
➡	18 SEJOUR	11.11	0.00	11.43
CLASSE 5		CREES+DETRUITS	CREES	DETRUITS
• •	12 SITE	0.00	0.00	0.00
• •	11 SITUATIO	0.00	0.00	0.00
➡	16 EMPLACEM	2.78	0.00	3.23
› ●	13 POSITION	2.78	20.00	0.00
➡	15 LIEU	2.78	0.00	3.23
› ●	17 ENDROIT	8.33	20.00	6.45
CLASSE 6		CREES+DETRUITS	CREES	DETRUITS
	14 PLACE	8.33	-1.00	8.33
CLASSE 7		CREES+DETRUITS	CREES	DETRUITS
• •	22 MID	0.00	0.00	0.00
• •	33 CHEZ-SOI	0.00	0.00	0.00
› ●	32 GITE	2.78	0.00	3.70
• ●	30 INTERIEU	5.56	22.22	0.00
‹ ●	21 TOIT	8.33	33.33	0.00
‹ ●	31 HABITACL	11.11	22.22	7.41
➡	29 LOGIS	16.67	0.00	22.22
➡	28 MAISON	16.67	0.00	22.22

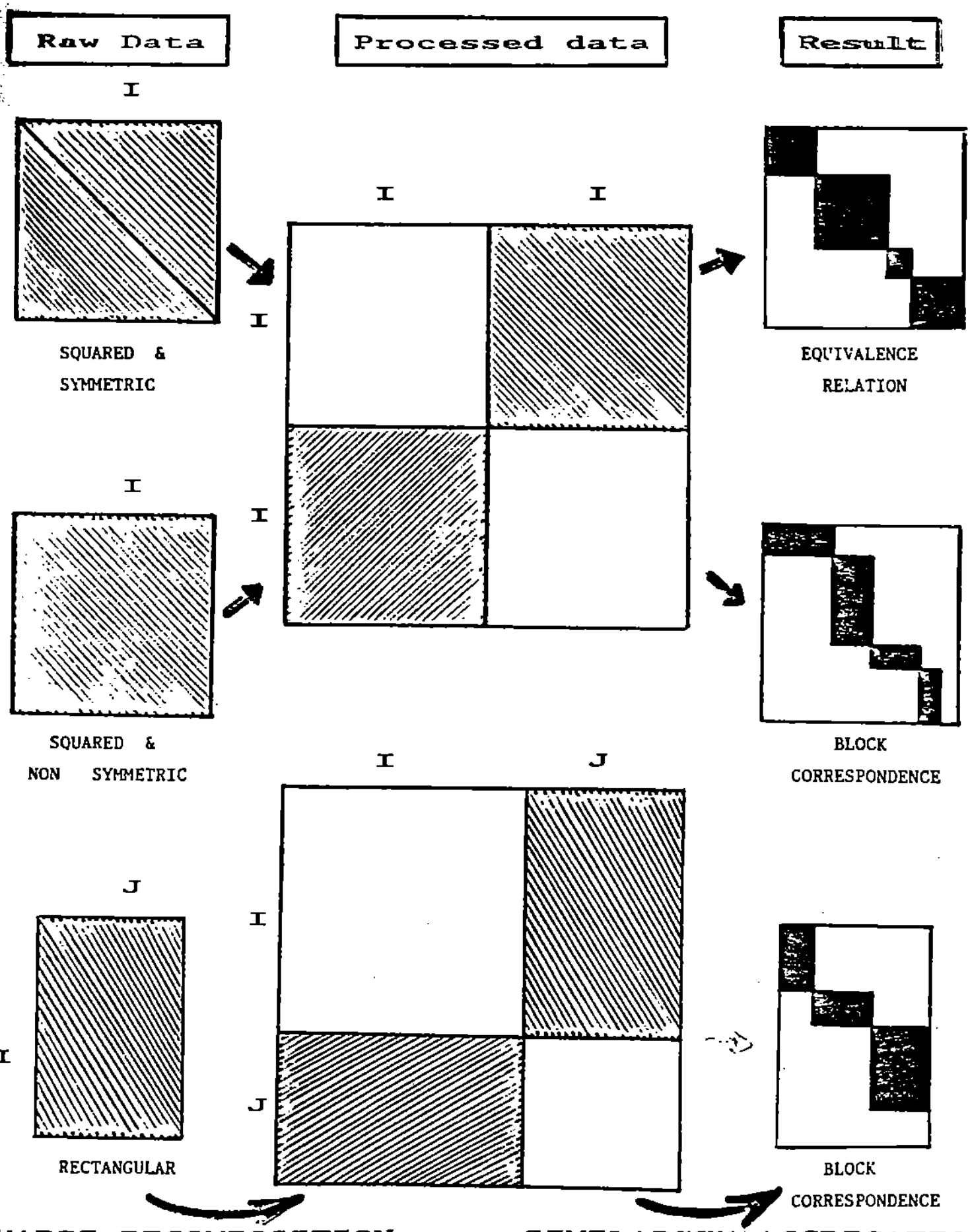
CONCEPTUAL LEXICON

● specific

● generic

› related

RELATIONAL ANALYSIS



QUADRIDECOMPOSITION AND DICTIONARIES

$\mathcal{S}$ = DICTIONARY OF SYNONYMS

I = { words belongin to the connected compon of an entry from $\mathcal{S}$ }

(S) = $(\mathcal{S}ij)$ i and j = 1, . . . , |I|
relational matrix of synonymy given by.

$\tilde{L}(i) = \{ j \in i : \mathcal{S}\ ij = 1 \}$ = synonyms with word i

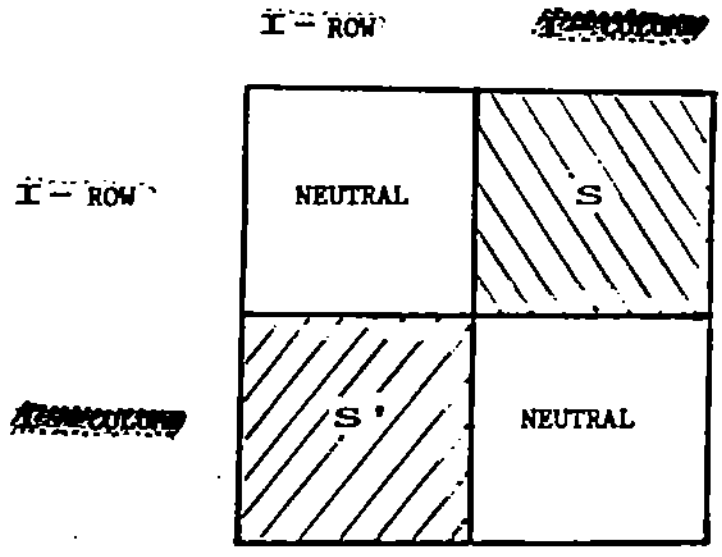
"ROW-WORD" (calling word)

[redacted] = $\{ j \in i : \mathcal{S}\ ji = 1 \}$ = words being synonyms with i

⟶ "COLUMN-WORD" (called word)

* very often: L(i) ≠ C(i). It is very interesting to "double" the words in the quadridecomposition matrix.

$\mathcal{D}$ =



* DURING THE PROCESSING, "ROW-WORDS" AND "COLUMN-WORDS" KEEP SEPARATED

* SOME WORDS WILL BELONG TO TWO DIFFERENT CLUSTERS IN THE OBTAINED SOLUTION:

I-ROW ∩ J-COLUMN = "BRIDGE-WORDS"

OBTAINED SOLUTION ON I =

PARTITION WITH IMBEDDED CLUSTERS

CONDORCET'S SOLUTION

commune
municipalité

agglomération
bourg
bourgade
hameau
localité
village

bled
coin
patelin
pays
trou

capitale
centre
cité
métropole
ville

+ additional informations on links between clusters

Connected component: "VILLE"

QUADRI-DECOMPOSITION TECHNIQUE

VILLE	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
METROPOLE	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CITE	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAPITALE	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
AGGLOMERATION	1	0	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0
CENTRE	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
VILLAGE	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	
LOCALITE	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	
BOURGADE	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	
BOURG	0	0	0	0	0	0	1	0	1	1	1	1	0	1	0	0	0	0	
TROU	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	0	0
PATELIN	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0	
BLED	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	
HAMEAU	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	
COMMUNE	0	0	0	0	1	0	1	0	1	1	0	0	0	0	1	0	0	1	
COIN	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	0	
PAYS	0	0	1	0	0	0	0	0	1	1	1	1	1	0	1	0	1	0	
MUNICIPALITE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1

RAW DATA MATRIX

connected component: VILLE

-Classe 1:
CITE-L
VILLE-C

-Classe 2:
CAPITALE-L CENTRE-L METROPOLE-L VILLE-L
CAPITALE-C CENTRE-C METROPOLE-C CITE-C AGGLOMERATION-C

-Classe 3:
VILLAGE-L BOURGADE-L BOURG-L COMMUNE-L LOCALITE-L AGGLOMERATION-L
VILLAGE-C BOURGADE-C BOURG-C

-Classe 4:
BLED-L COIN-L PATELIN-L TROU-L PAYS-L
BLED-C COIN-C PATELIN-C TROU-C

-Classe 5:
HAMEAU-L
HAMEAU-C LOCALITE-C

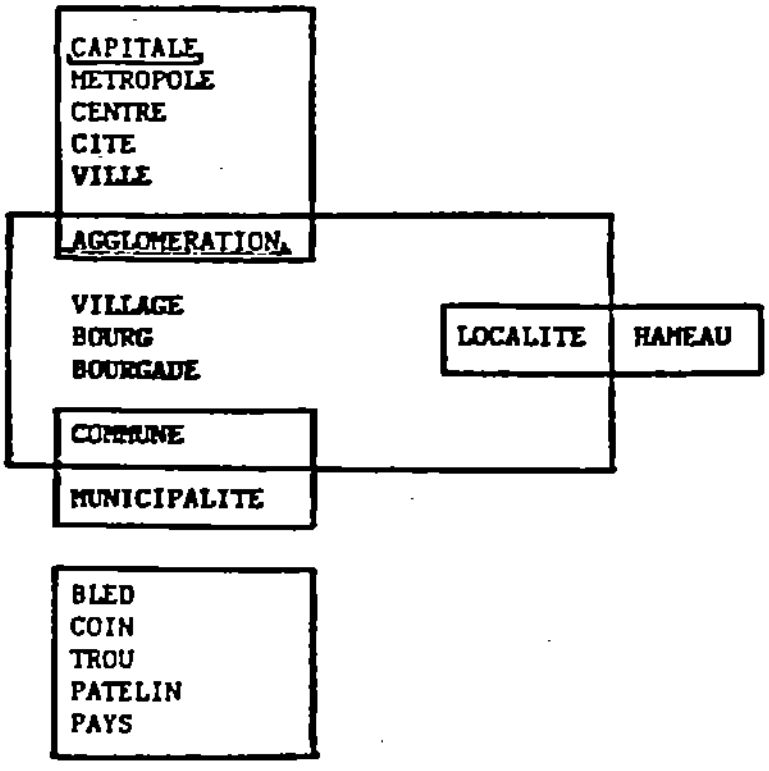
-Classe 6:
MUNICIPALITE-L
MUNICIPALITE-C COMMUNE-C

-Classe 7:
PAYS-C

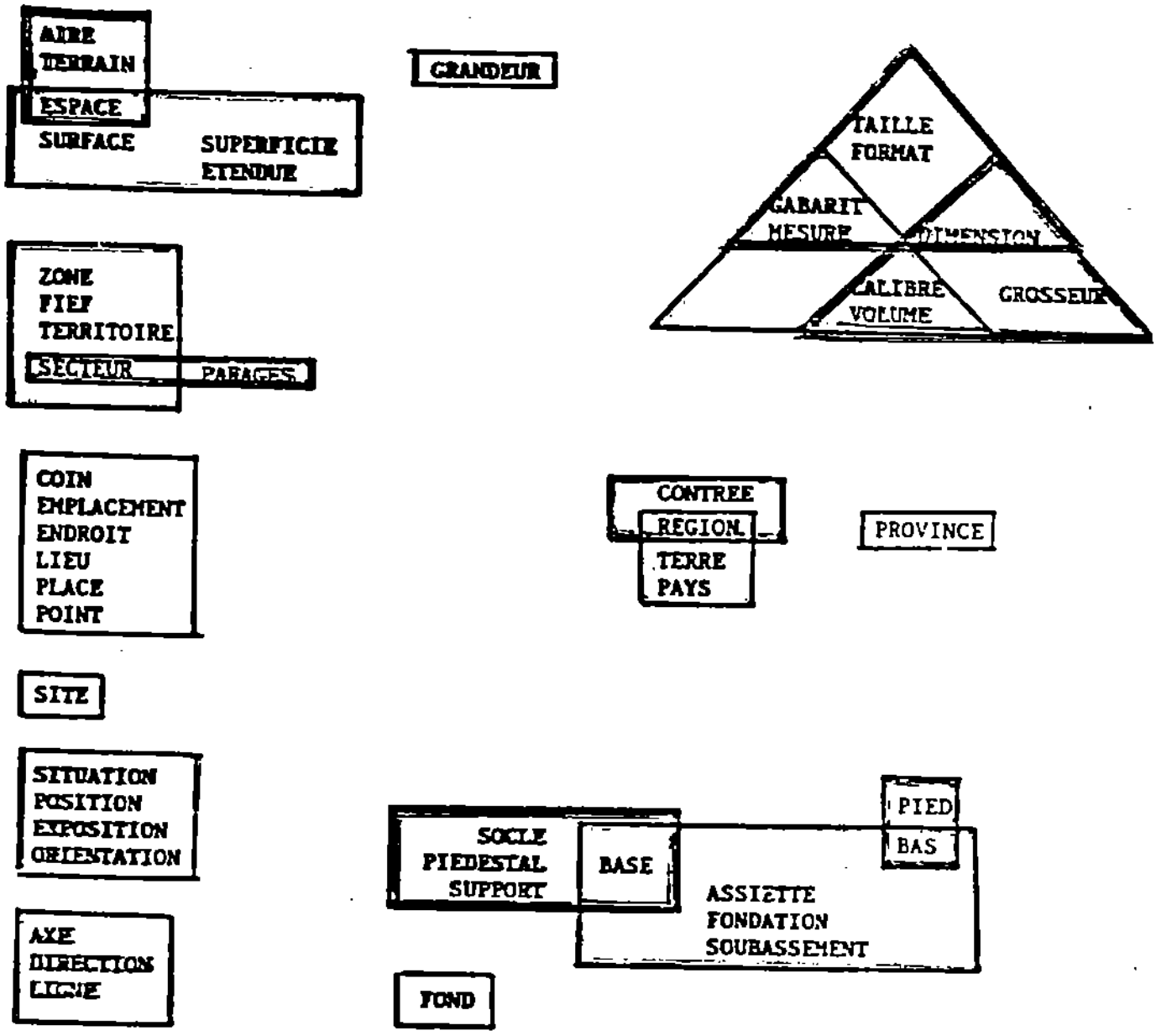
RESULTING PARTITION

	VILLE	AGGLOMERATION	CAPITALE	CENTRE	CITE	METROPOLE	VILLAGE	BOURGADE	BOURG	BLED	COIN	PATELIN	TROU	HAMEAU	LOCALITE	MUNICIPALITE	COMMUNE	PAYS
CITE	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CAPITALE	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
CENTRE	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
METROPOLE	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
VILLE	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
AGGLOMERATION	1	1	0	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0
BOURGADE	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
BOURG	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0
COMMUNE	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	0
LOCALITE	0	1	0	0	0	0	1	1	1	0	0	1	1	0	1	0	0	0
VILLAGE	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	0	0
BLED	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
COIN	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0
PATELIN	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1
PAYS	0	0	0	0	1	0	1	1	0	1	0	1	1	0	0	1	0	1
TROU	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
HAMEAU	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0
MUNICIPALITE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

DATA PERMUTED ACCORDING TO THE RESULT



EMBEDDED CLUSTERS PARTITION



IMBEDDED CLUSTERS PARTITION

CONNECTED COMPONENT: "COIN"

SYNONYMS AND DEFINITIONS

MAISON. : endroit où vivent les gens

FOYER. : lieu où réside la famille

LOGIS : endroit où on loge, où on habite

NID. : local où on vit avec confort et intimit

GÎTE. : lieu où l'on trouve à se loger

→ ENHANCEMENT OF SYNONYMS CLUSTERS

→ CHECKING THE INTERNAL COHERENCE BY CROSSING THE SYNONYMOUS PARADIGMS

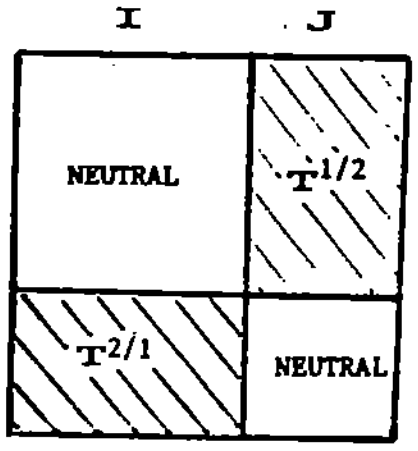
→ STUDY OF THE SYNTAGMATIC RELATIONS BETWEEN CLUSTERS

$\mathcal{B}$ - BILINGUAL DICTIONARY Language 1 (L1) / Language 2 (L2)

I - {words in L1 from the connected component of an entry in L1}

J - {words in L2 from the connected component of an entry in L2}

D-



$T^{1/2}$ - relational matrix of translation L1/I in $\mathcal{B}$

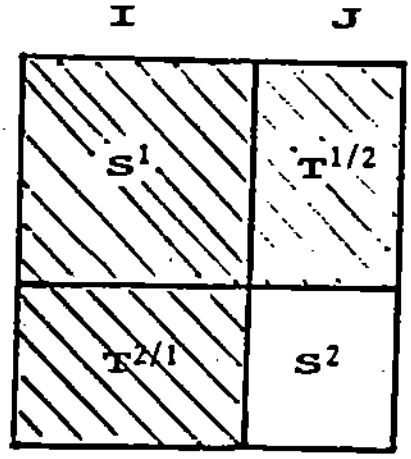
$T^{2/1}$ - relational matrix of translation L2/I in $\mathcal{B}$

$T^{1/2}$ & $T^{2/1}$ are not trivially derived the one from each other

* * *

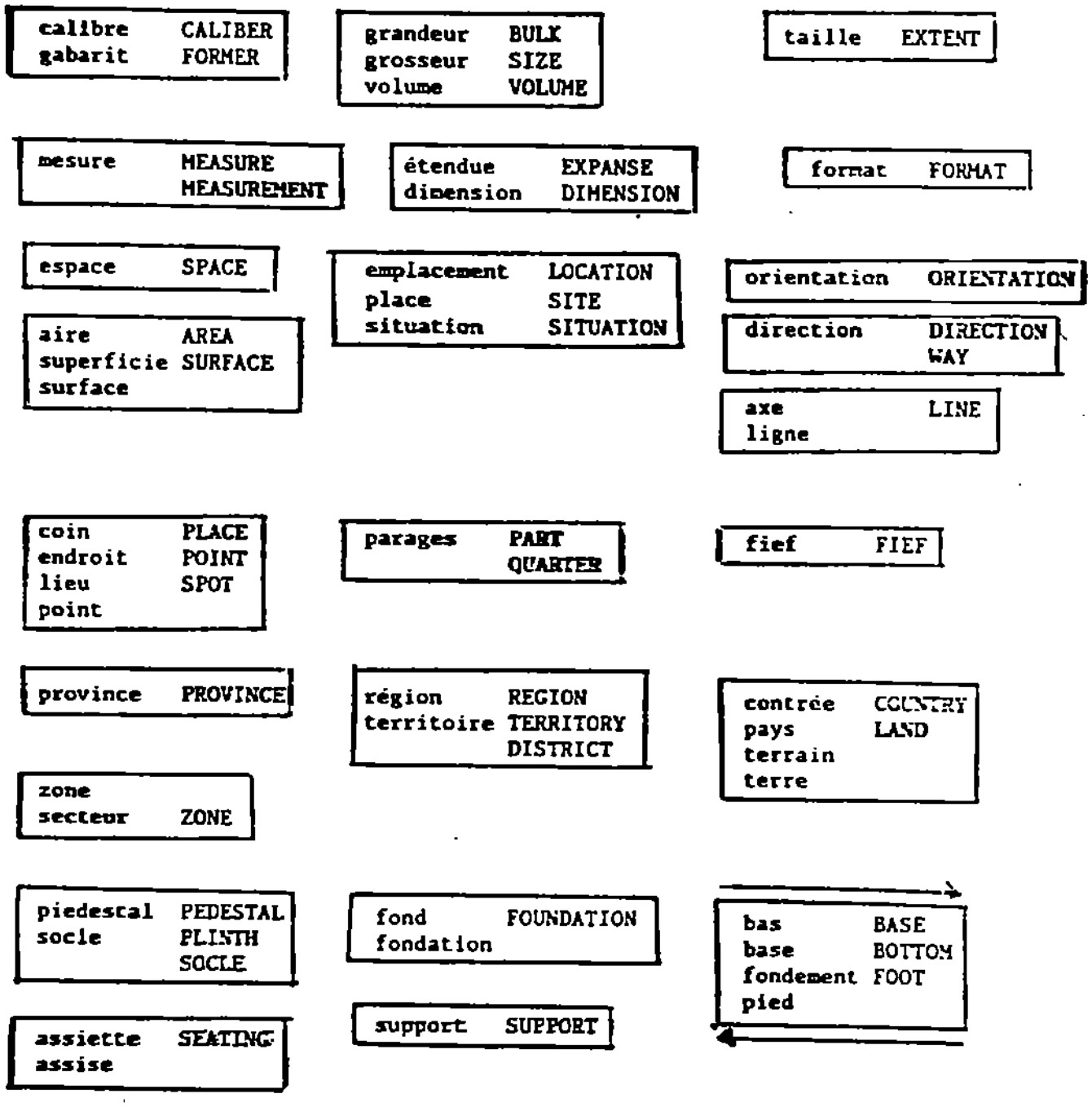
B. $\mathcal{S}^1$ - synonyms (L1), $\mathcal{S}^2$ - synonyms (L2)

D-



S^1 - relational matrix of synonymy (Language 1) in $\mathcal{S}^1$

S^2 - relational matrix of synonymy (Language 2) in $\mathcal{S}^2$

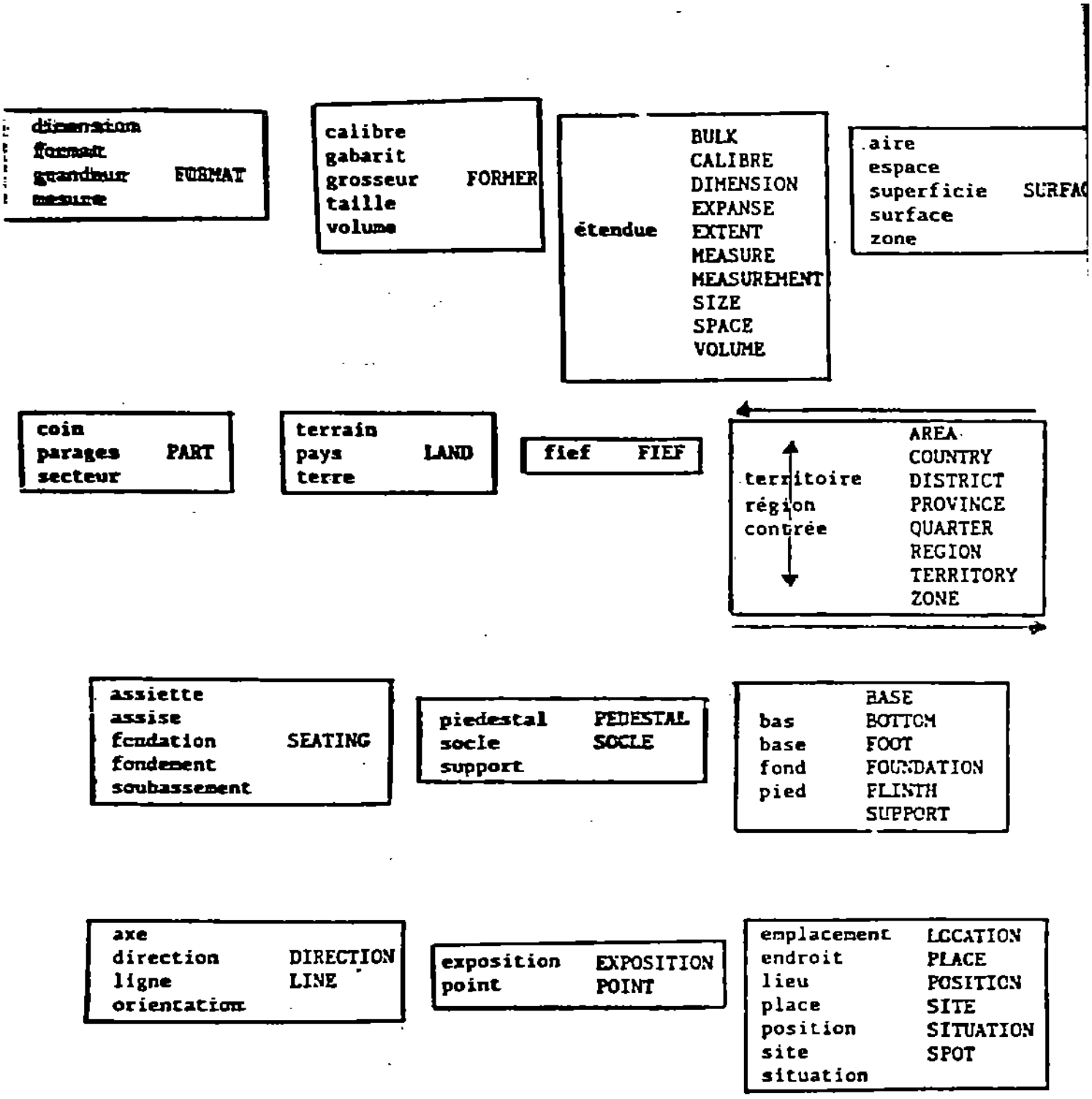


QUADRI-DECOMPOSITION

BILINGUAL DICTIONARY:

A = French / English

B = English / French



QUADRI-DECOMPOSITION

BILINGUAL DICTIONARY &

DICTIONARY OF SYNONYMS

[N] = French synonyms

[A] = tranlation French / English

M = English synonyms

[B] = translation English / French