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# J-Electre-v1.0 User Guide: An ELECTRE I, I<sub>s</sub>, I<sub>v</sub>, II, III, IV, TRI and TRI ME software.

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User Guide

# J-Electre-v1.0

An ELECTRE I, I<sub>s</sub>, I<sub>v</sub>, II, III, IV, TRI  
and TRI ME software.

Valdecy Pereira, Helder Gomes Costa and Livia Dias de Oliveira Nepomuceno

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## 1- J-Electre-v1.0 - Installation Notes

The **J-Electre-v1.0 (jar)** is a runnable .jar file that does not need to be installed and it run in any OS. The unique requisite is the need to have the latest Java SE program installed. Check if your computer has the latest release, if not please download it (preferably Java SE 7 or superior) at: [www.oracle.com](http://www.oracle.com)

or [www.oracle.com/technetwork/pt/java/javase/downloads/index.html?ssSourceSiteId=otnes](http://www.oracle.com/technetwork/pt/java/javase/downloads/index.html?ssSourceSiteId=otnes)

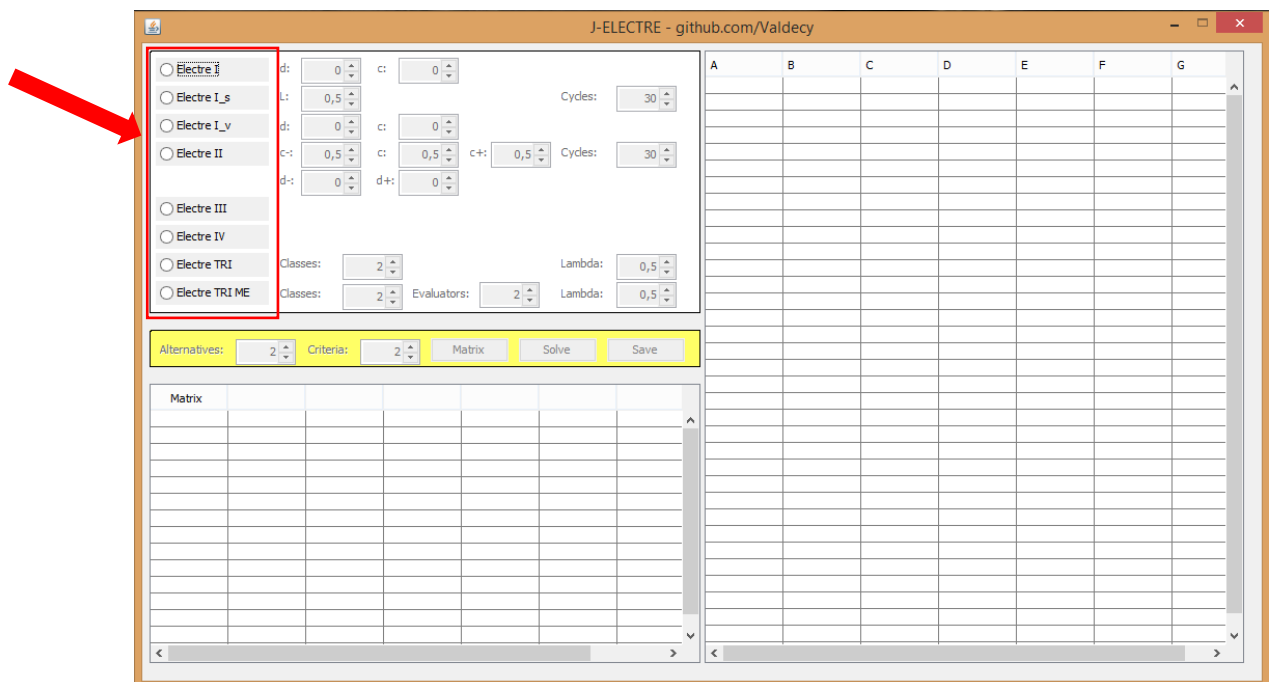
The **J-Electre-v1.0 (exe)** is a runnable .exe file that does not need to be installed and also do not need the installation of the latest Java SE program.

Download J-Electre-v1.0 at: <https://sourceforge.net/projects/j-electre/files/>

## 2- J-Electre-v1.0 - First Use

In the main screen choose the Electre Method between the following options:

- a) Electre I
- b) Electre I\_s
- c) Electre I\_v
- d) Electre II
- e) Electre III
- f) Electre IV
- g) Electre TRI
- h) Electre TRI ME (Multi-Evaluator)



### 2.1 Electre I

To explain how to use the **J-Electre-v1.0** in order to solve **Electre I** problems, the following example will be used:

	g1	g2	g3	g4
W	2	1	5	3
a1	150	1	20	3000
a2	300	0	10	0
a3	250	0	10	2250
a4	110	1	20	2800
a5	120	1	50	1000

This problem has 5 alternatives (*a1*, *a2*, *a3*, *a4*, *a5*) and 4 criteria (*g1*, *g2*, *g3*, *g4*). The weights (importance) of each criterion is represented by the **W** row.

After Choosing **Electre I** method, two parameters need to be set: **d** (discordance index – varying from 0 to 1) and **c** (concordance index – varying from 0 to 1). For the given example **d** = 0.6 and **c** = 0.7.

The screenshot shows the J-ELECTRE software interface. The 'Electre I' method is selected. The discordance index **d** is set to 0.6 and the concordance index **c** is set to 0.7. Other parameters like 'Classes' and 'Evaluators' are also visible. The 'Matrix' button is highlighted in yellow.

Insert the number of **Alternatives** (varying from 2 to 1,000), **Criteria** (varying from 2 to 1,000) and press the **Matrix** button to build the performance matrix.

The screenshot shows the J-ELECTRE software interface. The 'Alternatives' input field is set to 5 and the 'Criteria' input field is set to 4. The 'Matrix' button is highlighted in yellow. The 'Matrix' table is visible, showing columns for 'g1', 'g2', 'g3', and 'g4' and rows for 'a1', 'a2', 'a3', 'a4', and 'a5'.

Matrix	g1	g2	g3	g4
W				
a1				
a2				
a3				
a4				
a5				

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

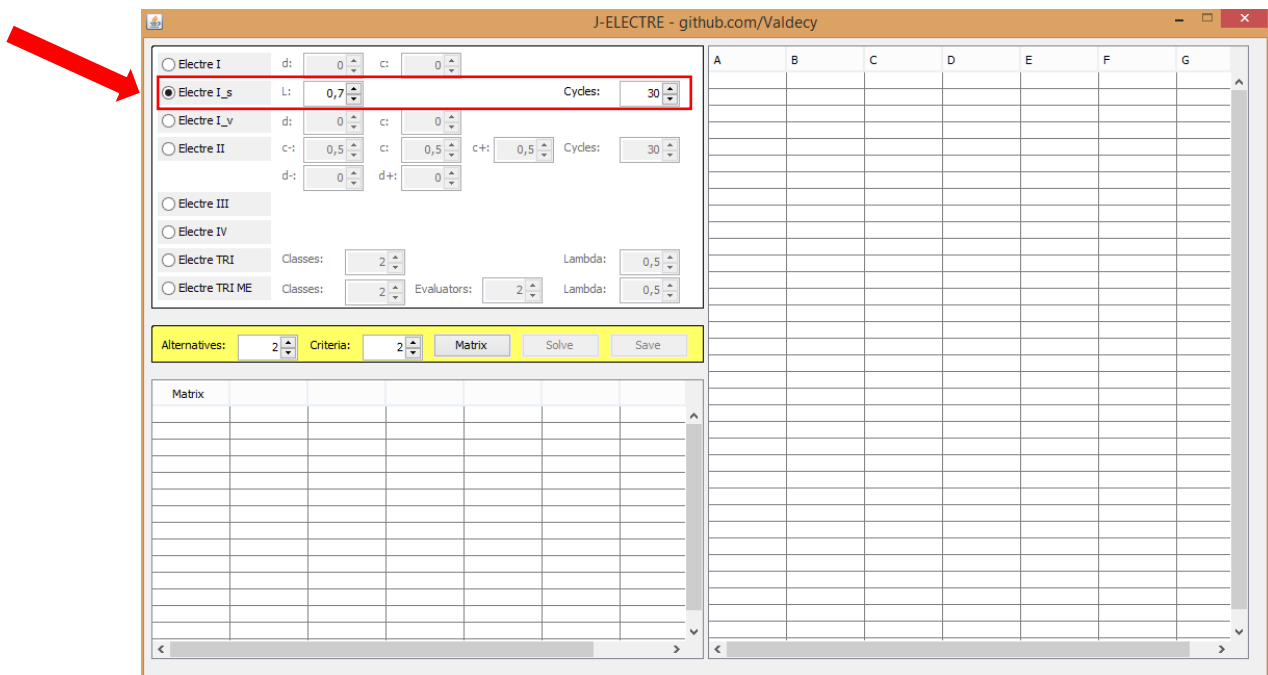
The output contains: **Concordance Matrix**, **Discordance Matrix**, **Credibility Matrix**, **Kernel** (set of alternatives that are not dominated) and **Dominated** (set of alternatives that are dominated by the alternatives in the Kernel set).

## 2.2 Electre I<sub>s</sub>

To explain how to use the **J-Electre-v1.0** in order to solve **Electre I<sub>s</sub>** problems, the following example (ROY & SKALKA, 1985) will be used:

	g1	g2	g3	g4	g5	g6	g7
Q	2000	2	1	1	1	50	0.1
P	3000	5	2	3	2	82	0.2
V	3500	7	3	5	6	90	0.5
W	0.3	0.1	0.3	0.1	0.2	0.2	0.1
a1	16000	201	8	40	5	378	31.3
a2	18000	199	8	35	5	474	33.0
a3	16000	195	8	36	1	480	33.9
a4	18000	199	8	35	5	430	33.1
a5	17000	191	8	34	1	430	34.4
a6	17000	199	8	35	4	494	32.0
a7	15000	194	8	37	3	452	33.8
a8	18000	200	8	36	6	475	33.8
a9	17000	209	7	37	3	440	30.9

This problem has 9 alternatives (*a1*, *a2*, *a3*, *a4*, *a5*, *a6*, *a7*, *a8*, *a9*) and 7 criteria (*g1*, *g2*, *g3*, *g4*, *g5*, *g6*, *g7*). The **Q** row represents the weak preference, the **P** row represents the strong





Insert the number of **Alternatives** (varying from 2 to 1,000), **Criteria** (varying from 2 to 1,000) and press the **Matrix** button to build the performance matrix.

The screenshot shows the J-ELECTRE software interface. On the left, there are several radio buttons for selecting the ELECTRE method (I, I\_s, I\_v, II, III, IV, TRI, TRI ME). Below these are input fields for 'Classes' and 'Lambda'. A red arrow points to the 'Alternatives' input field, which is set to 9, and the 'Criteria' input field, which is set to 7. The 'Matrix' button is highlighted. On the right, there is a large empty table with columns labeled A through G and rows labeled Q through W.

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The screenshot shows the J-ELECTRE software interface with the performance matrix filled. A red arrow points to the 'Solve' button. The results are displayed in several sections: the 'Matrix' table, the 'Cycles' table, the 'Kernel' table, and the 'Dominated' table. The 'Matrix' table shows values for each alternative across the criteria. The 'Cycles' table shows the sequence of alternatives in each cycle. The 'Kernel' table shows the set of alternatives that are not dominated after the cycles are removed. The 'Dominated' table shows the set of alternatives that are dominated by the alternatives in the Kernel set after the cycles are removed.

Matrix	g1	g2	g3	g4	g5	g6
Q	2000	2	1	1	1	50
P	3000	5	2	3	2	82
V	3500	7	3	5	6	90
W	0.3	0.1	0.3	0.1	0.2	0.2
a1	16000	201	8	40	5	378
a2	18000	199	8	35	5	474
a3	16000	195	8	36	1	480
a4	18000	199	8	35	5	430
a5	17000	191	8	34	1	430
a6	17000	199	8	35	4	494
a7	15000	194	8	37	3	452
a8	18000	200	8	36	6	475
a9	17000	209	7	37	3	440

Cycles	a2	a4	a2
a2	a4	a2	
a3	a7	a3	
a3	a8	a3	
a3	a8	a7	a3

Kernel	a5	a8	a9
a5	a8	a9	
a1	a2	a3	a4
a6			

Dominated	a1	a2	a3	a4	a6	a7
a1	a2	a3	a4	a6	a7	

The output contains: **Concordance Matrix**, **Discordance Matrix**, **Credibility Matrix**, **Cycles** (first cycle:  $a2 \rightarrow a4 \rightarrow a2$ ; second cycle:  $a3 \rightarrow a7 \rightarrow a3$  and the third cycle:  $a3 \rightarrow a8 \rightarrow a7 \rightarrow a3$ ), **Kernel** (set of alternatives that are not dominated after the cycles are removed) and **Dominated** (set of alternatives that are dominated by the alternatives in the Kernel set after the cycles are removed).

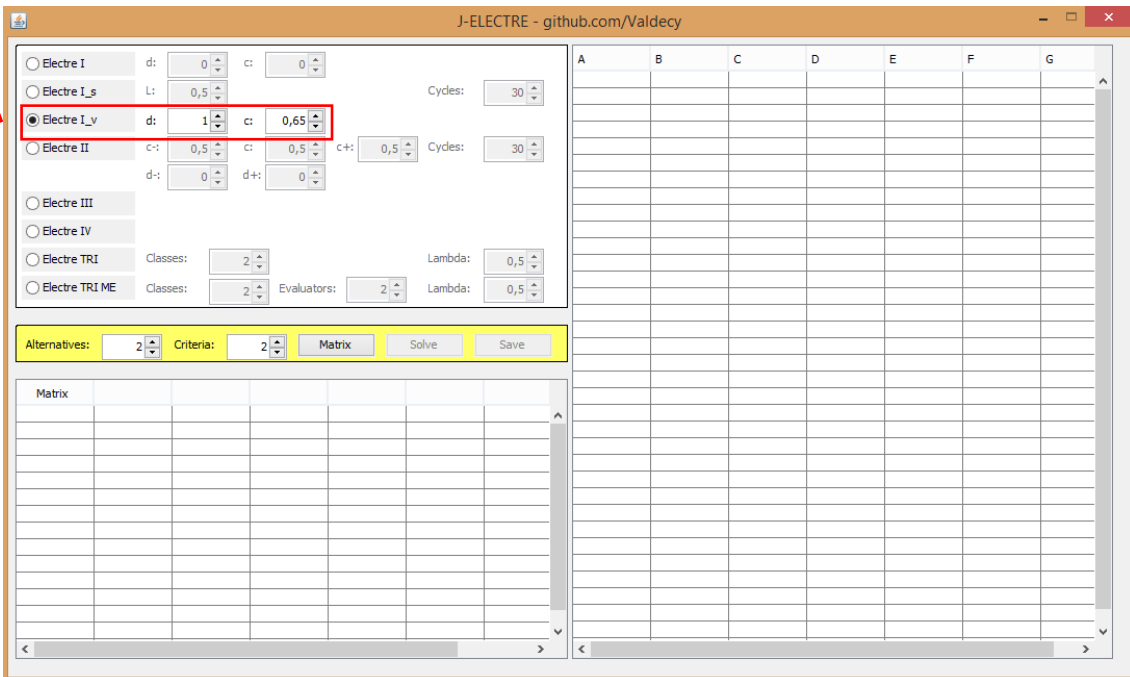
## 2.3 Electre I\_v

To explain how to use the **J-Electre-v1.0** in order to solve **Electre I\_v** problems, the following example will be used:

	g1	g2	g3	g4
V	2	2	2	2
W	7	3	5	6
a1	15	9	6	10
a2	10	5	7	8
a3	22	12	1	14
a4	31	10	6	18
a5	8	9	0	9

This problem has 5 alternatives ( $a1$ ,  $a2$ ,  $a3$ ,  $a4$ ,  $a5$ ) and 4 criteria ( $g1$ ,  $g2$ ,  $g3$ ,  $g4$ ). The **V** row represents the Veto and the weights (importance) of each criterion is represented by the **W** row.

After Choosing **Electre I\_v** method, two parameters need to be set: **d** (discordance index – with only two values 0 or 1) and **c** (concordance index – varying from 0 to 1). For the given example **d** = 1 and **c** = 0.65.



The screenshot shows the J-ELECTRE software interface. A red arrow points to the 'Electre I\_v' method selection. The parameters are set as follows:

- Method: **Electre I\_v** (selected)
- Discordance index (**d**): 1
- Concordance index (**c**): 0.65

Other visible settings include:

- Electre I: **d**: 0, **c**: 0
- Electre I\_s: **L**: 0.5
- Electre II: **c**: 0.5, **d**: 0, **c+**: 0.5, **d+**: 0
- Electre III: **L**: 0.5
- Electre IV: **L**: 0.5
- Electre TRI: **Classes**: 2, **Lambda**: 0.5
- Electre TRI ME: **Classes**: 2, **Evaluators**: 2, **Lambda**: 0.5

At the bottom, there are fields for 'Alternatives' (set to 2) and 'Criteria' (set to 2), along with buttons for 'Matrix', 'Solve', and 'Save'.

Insert the number of **Alternatives** (varying from 2 to 1,000), **Criteria** (varying from 2 to 1,000) and press the **Matrix** button to build the performance matrix.

The screenshot shows the J-ELECTRE software interface. On the left, there are several radio buttons for selecting the ELECTRE method (I, I\_s, I\_v, II, III, IV, TRI, TRI ME). Below these are input fields for 'Classes', 'Evaluators', and 'Lambda'. A red arrow points to the 'Alternatives' input field, which is set to 5, and the 'Criteria' input field, which is set to 4. The 'Matrix' button is highlighted with a red box. To the right of the input fields is a large empty table with columns labeled A through G, representing the performance matrix.

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The screenshot shows the J-ELECTRE software interface after solving the problem. The 'Matrix' button is now disabled. The 'Solve' button is highlighted with a red box. The performance matrix is filled with values. The output results are displayed on the right side of the interface, including the Concordance Matrix, Discordance Matrix, Credibility Matrix, Kernel, and Dominated sets.

Matrix	g1	g2	g3	g4
W	2	2	2	2
a1	15	9	6	10
a2	10	5	7	8
a3	22	12	1	14
a4	31	10	6	18
a5	8	9	0	9

Concordance Matrix:

	a1	a2	a3	a4	a5
a1	0.0	0.7619	0.2381	0.2381	1.0
a2	0.2381	0.0	0.2381	0.2381	0.571
a3	0.7619	0.7619	0.0	0.1429	1.0
a4	1.0	0.7619	0.8571	0.0	1.0
a5	0.1429	0.4286	0.0	0.0	0.0

Discordance Matrix:

	a1	a2	a3	a4	a5
a1	0.0	0.0	1.0	1.0	0.0
a2	1.0	0.0	1.0	1.0	1.0
a3	1.0	1.0	0.0	1.0	0.0
a4	0.0	0.0	1.0	0.0	0.0
a5	1.0	1.0	1.0	1.0	0.0

Credibility Matrix:

	a1	a2	a3	a4	a5
a1	0.0	1.0	0.0	0.0	1.0
a2	0.0	0.0	0.0	0.0	0.0
a3	1.0	1.0	0.0	0.0	1.0
a4	1.0	1.0	1.0	0.0	1.0
a5	0.0	0.0	0.0	0.0	0.0

Kernel:

Dominated:

Kernel: a4

Dominated: a1 a2 a3 a5

The output contains: **Concordance Matrix**, **Discordance Matrix**, **Credibility Matrix**, **Kernel** (set of alternatives that are not dominated) and **Dominated** (set of alternatives that are dominated by the alternatives in the Kernel set).

## 2.4 Electre II

To explain how to use the **J-Electre-v1.0** in order to solve **Electre II** problems, the following example (WANG & TRIANTAPHYLLOU, 2006) will be used:

	g1	g2	g3	g4	g5	g6	g7
W	0.078	0.118	0.157	0.314	0.235	0.039	0.059
a1	1	2	1	5	2	2	4
a2	3	5	3	5	3	3	3
a3	3	5	3	5	3	2	2
a4	1	2	2	5	1	1	1
a5	1	1	3	5	4	1	5

This problem has 5 alternatives ( $a1, a2, a3, a4, a5$ ) and 7 criteria ( $g1, g2, g3, g4, g5, g6, g7$ ). The weights (importance) of each criterion is represented by the **W** row.

After Choosing **Electre II** method, six parameters need to be set: three levels of concordance index  $c^-$ ,  $c$  and  $c^+$  (where  $0.5 \leq c^- \leq c \leq c^+ \leq 1$ ), two levels of discordance  $d^-$  and  $d^+$  (where  $0 \leq d^- \leq d^+ \leq 1$ ), and the maximum number of **Cycles** (varying from 0 to 9,000) that will be removed.

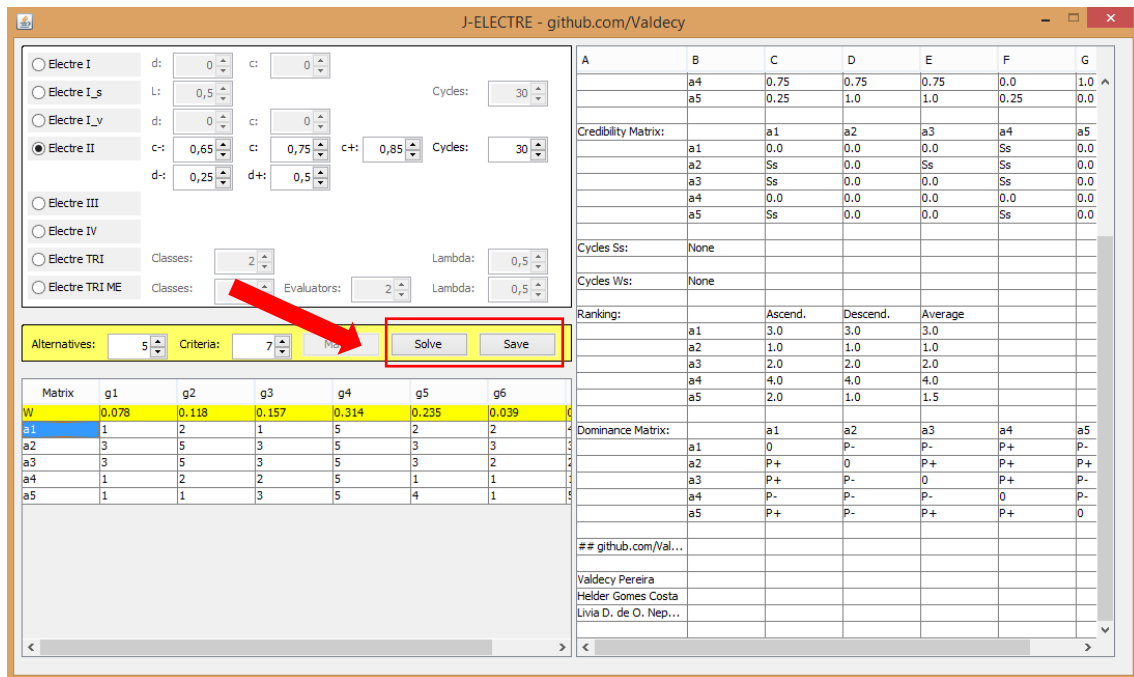
Cycles invalidate the solution obtained by the **Electre II** algorithm, and in order to deal with cycles we used the Johnson Algorithm (JOHNSON, 1975), implemented by Meyer (2012) and modified by us, that can find all cycles in a directed graph. Then we remove each found cycle in order to have a valid solution.

However, if a problem has too many cycles, as a rule of thumb above 30, consider first increasing the parameters values and if there still too many cycles, consider removing an alternative (or alternatives – one at a time) that appears frequently in most cycles (all cycles are indicated in the output table and detecting them should not be difficult).

For the given example  $c^- = 0.65$ ,  $c = 0.75$ ,  $c^+ = 0.85$ ,  $d^- = 0.25$ ,  $d^+ = 0.5$  and **Cycles** = 30.



Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.



The output contains: **Concordance Matrix**, **Discordance Matrix**, **Credibility Matrix**, **Cycles Ss** (cycles from the strong graph), **Cycles Ws** (cycles from the weak graph), **Ranking Ascending** (from the worst alternative to the best), **Ranking Descending** (from the best alternative to the worst), **Ranking Average** (In order to have a complete ranking, we choose to build the final ranking as an average between the ascending and descending ranking) and **Dominance Matrix** (To build the classical pre-ordination or final ranking, the dominance matrix is provided)

## 2.5 Electre III

To explain how to use the **J-Electre-v1.0** in order to solve **Electre III** problems, the following example will be used:

	g1	g2	g3	g4
Q	0.3	0.3	0.3	0.3
P	0.5	0.5	0.5	0.5
V	0.7	0.7	0.7	0.7
W	0.2754741	0.2735455	0.1758277	0.2221151
a1	8.84	8.79	6.43	6.95
a2	8.57	8.51	5.47	6.91
a3	7.76	7.75	5.34	8.76
a4	7.97	9.12	5.93	8.09
a5	9.03	8.97	8.19	8.1
a6	7.41	7.87	6.77	7.23

This problem has 6 alternatives ( $a1$ ,  $a2$ ,  $a3$ ,  $a4$ ,  $a5$ ,  $a6$ ) and 4 criteria ( $g1$ ,  $g2$ ,  $g3$ ,  $g4$ ). The **Q** row represents the weak preference (as constants), the **P** row represents the strong preference (as

constants), the **V** row represents the Veto (respecting:  $V \geq P \geq Q$ ) and finally, the weights (importance) of each criterion is represented by the **W** row.

Insert the number of **Alternatives** (varying from 2 to 1,000), **Criteria** (varying from 2 to 1,000) and press the **Matrix** button to build the performance matrix.

The screenshot shows the J-ELECTRE software interface. On the left, there are configuration options for different ELECTRE methods (I, I\_s, I\_v, II, III, IV, TRI, TRI ME). Below these, there are input fields for 'Alternatives' (set to 6), 'Criteria' (set to 4), and buttons for 'Matrix', 'Solve', and 'Save'. A red arrow points to the 'Matrix' button. To the right of the configuration panel is a large empty table with columns labeled A through G, representing the performance matrix.

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The screenshot shows the J-ELECTRE software interface after solving the problem. The 'Solve' button is highlighted with a red arrow. The results are displayed in several tables:

- Matrix:** A table with 6 rows (Q, P, V, W, a1, a2, a3, a4, a5, a6) and 4 columns (g1, g2, g3, g4). The 'W' row is highlighted in yellow.
- Credibility Matrix:** A table with 6 rows (a1, a2, a3, a4, a5, a6) and 5 columns (a1, a2, a3, a4, a5). The values are 0.0, 0.0, 0.0, 0.0, 0.0, 0.0.
- Ranking:** A table with 6 rows (a1, a2, a3, a4, a5, a6) and 3 columns (Ascend., Descend., Average). The values are 3.0, 2.0, 2.0, 3.0, 1.0, 4.0.
- Dominance Matrix:** A table with 6 rows (a1, a2, a3, a4, a5, a6) and 5 columns (a1, a2, a3, a4, a5). The values are 0, 0, 0, 0, 0, 0.

The output contains: **Concordance Matrix**, **Discordance Matrix** (one for each criterion), **Credibility Matrix**, **Ranking Ascending** (from the worst alternative to the best), **Ranking Descending** (from the best alternative to the worst), **Ranking Average** (In order to have a complete ranking, we choose to build the final ranking as an average between the ascending

and descending ranking) and **Dominance Matrix** (To build the classical pre-ordination or final ranking, the dominance matrix is provided)

## 2.6 Electre IV

To explain how to use the **J-Electre-v1.0** in order to solve **Electre IV** problems, the following example will be used:

	g1	g2	g3	g4	g5	g6	g7	g8
Q	10	10	10	10	10	10	10	10
P	20	20	20	20	20	20	20	20
V	100	100	100	100	100	100	100	100
a1	15	80	60	30	60	50	60	70
a2	25	0	40	30	40	40	50	140
a3	25	0	50	30	40	40	50	140
a4	25	0	50	30	50	40	70	140
a5	25	0	50	30	50	40	50	140
a6	15	20	50	30	50	60	60	100
a7	15	80	50	50	40	90	60	100

This problem has 7 alternatives (*a1, a2, a3, a4, a5, a6, a7*) and 8 criteria (*g1, g2, g3, g4, g5, g6, g7, g8*). The **Q** row represents the weak preference, the **P** row represents the strong preference, the **V** row represents the Veto (respecting:  $V \geq P \geq Q$ ).

Insert the number of **Alternatives** (varying from 2 to 1,000), **Criteria** (varying from 2 to 1,000) and press the **Matrix** button to build the performance matrix.

The screenshot shows the J-ELECTRE software interface. On the left, there are radio buttons for selecting the method: Electre I, Electre I\_s, Electre I\_v, Electre II, Electre III, **Electre IV** (selected), Electre TRI, and Electre TRI ME. Below these are input fields for 'Classes' (set to 2), 'Evaluators' (set to 2), and 'Lambda' (set to 0,5). A red arrow points to the 'Matrix' button in the 'Alternatives: 7, Criteria: 8' section. Below this, a small table shows the performance matrix for the first six criteria (g1 to g6) for alternatives Q, P, V, a1, a2, a3, a4, a5, a6, and a7. The rows for Q, P, and V are highlighted in green. On the right, a large empty table with columns A through G is visible.



Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The output contains: **Credibility Matrix**, **Ranking Ascending** (from the worst alternative to the best), **Ranking Descending** (from the best alternative to the worst), **Ranking Average** (In order to have a complete ranking, we choose to build the final ranking as an average between the ascending and descending ranking) and **Dominance Matrix** (To build the classical pre-ordination or final ranking, the dominance matrix is provided)

## 2.7 Electre TRI

To explain how to use the **J-Electre-v1.0** in order to solve **Electre TRI** problems, the following example (MOUSSEAU, 1999.) will be used:

	g1	g2	g3	g4	g5
b2	70	75	80	75	85
b1	50	48	55	55	60
Q	5	5	5	5	5
P	10	10	10	10	10
V	30	30	30	30	30
W	1	1	1	1	1
a1	75	67	85	82	90
a2	28	35	70	90	95
a3	45	60	55	68	60

This problem has 3 alternatives ( $a1$ ,  $a2$ ,  $a3$ ,  $a4$ ,  $a5$ ) and 4 criteria ( $g1$ ,  $g2$ ,  $g3$ ,  $g4$ ). The **bn** rows represents the profiles (respecting:  $b_n \geq b_{n-1}$ ). The **Q** row represents the weak preference, the **P** row represents the strong preference, the **V** row represents the Veto (respecting:  $V \geq P \geq Q$ ) and finally, the weights (importance) of each criterion is represented by the **W** row.

[illegible]

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The output contains: **Concordance  $c(ai;bh)$**  – (global concordance between alternative  $i$  and profile  $h$ ), **Concordance  $c(bh;ai)$**  – (global concordance between profile  $h$  and alternative  $i$ ), **Discordance  $d(ai;bh)$**  – (global discordance between alternative  $i$  and profile  $h$ ), **Discordance  $d(bh;ai)$**  – (global discordance between profile  $h$  and alternative  $i$ ), **Credibility Matrix**, **Classification Pessimist** (from the upper profile  $bn$  to  $b1$ , Class  $A > B > C...$ ), **Classification Optimist** (from the lower profile  $b1$  to  $bn$ , Class  $A > B > C...$ ).

## 2.8 Electre TRI ME

To explain how to use the **J-Electre-v1.0** in order to solve **Electre TRI ME** problems (developed by Livia Dias Nepomuceno and Helder Gomes Costa), the following example will be used:

	EV1(g1)	EV1(g2)	EV1(g3)	EV2(g1)	EV2(g2)	EV2(g3)
b2	2	3	3	3	3	2
b1	1	2	2	1	2	1
Q	0	0	0	0	0	0
P	0	0	0	0	0	0
V	5	5	5	5	5	5
W	0.1	0.2	0.2	0.3	0.3	0.1
a1	2	2	1	3	1	3
a2	0	2	1	0	0	0
a3	1	3	3	2	1	1

This problem has 3 alternatives ( $a1$ ,  $a2$ ,  $a3$ ), 3 criteria ( $g1$ ,  $g2$ ,  $g3$ ,  $g4$ ) and two Evaluators ( $EV1$ ,  $EV2$ ). Each evaluator judges the same set of criteria and have their own set of weights (which may be the same). The  $bn$  rows represents the profiles (respecting:  $b_n \geq b_{n-1}$ ). The  $Q$  row represents the weak preference, the  $P$  row represents the strong preference, the  $V$  row

After Choosing **Electre TRI ME** method, three parameters need to be set: **Classes** (the total number of classes – varying from 2 to 100), Evaluators (the total number of evaluators, judges or decision makers – varying from 2 to 100) and **Lambda** (cut-off level – varying from 0.5 to 1). For the given example **Classes** = 3 (hence we have two profiles: b2 and b1), **Evaluators** = 2 and **Lambda** = 0.75.



J-ELECTRE - github.com/Valdecy

☐ Electre I  
☐ Electre I<sub>s</sub>  
☐ Electre I<sub>v</sub>  
☐ Electre II  
☐ Electre III  
☐ Electre IV  
☐ Electre TRI  
☒ Electre TRI ME

d: 0 c: 0  
 L: 0,5 Cycles: 30  
 d: 0 c: 0  
 c+: 0,5 Cycles: 30  
 d+: 0  
 Classes: 2 Lambda: 0,5  
 Classes: 3 Evaluators: 2 Lambda: 0,75

Alternatives: 3 Criteria: 3 Matrix Solve Save

Matrix	EV1(g1)	EV1(g2)	EV1(g3)	EV2(g1)	EV2(g2)	EV2(g3)
b2						
b1						
Q						
p						
y						
w						
a1						
a2						
a3						

Insert the values in the performance matrix and then press the **Solve** button to solve the problem. To save (export) the results to a spreadsheet press the **Save** button.

The screenshot shows the J-ELECTRE software interface. On the left, there are input fields for various parameters including 'Electre I', 'Electre I\_s', 'Electre I\_v', 'Electre II', 'Electre III', 'Electre IV', 'Electre TRI', and 'Electre TRI ME'. A red arrow points to the 'Solve' button. Below the input fields, there are 'Alternatives' and 'Criteria' dropdown menus, and a 'Matrix' table. The 'Matrix' table has columns for EV1(g1), EV1(g2), EV1(g3), EV2(g1), EV2(g2), and EV2(g3). The results table on the right contains several sections: 'Discordance d(ai;bh)', 'Discordance d(bh;ai)', 'Credibility', and 'Classification'. The 'Classification' section shows 'Alternative' and 'Pessimist' results.

Matrix	EV1(g1)	EV1(g2)	EV1(g3)	EV2(g1)	EV2(g2)	EV2(g3)
b2	2	3	3	3	3	2
b1	1	2	2	1	2	1
Q	0	0	0	0	0	0
P	0	0	0	0	0	0
V	5	5	5	5	5	5
W	0.1	0.2	0.2	0.3	0.3	0.1
a1	2	2	1	3	1	3
a2	0	2	1	0	0	0
a3	1	3	3	2	1	1

Discordance d(ai;bh):	EV1(g1)	EV1(g2)	EV1(g3)	EV2(g1)	EV2(g2)	EV2(g3)
d(a1;b2)	0.0	0.2	0.4	0.0	0.0	0.0
d(a2;b2)	0.4	0.2	0.4	0.6	0.0	0.0
d(a3;b2)	0.2	0.0	0.0	0.2	0.0	0.0
d(a1;b1)	0.0	0.0	0.2	0.0	0.0	0.0
d(a2;b1)	0.2	0.0	0.2	0.2	0.0	0.0
d(a3;b1)	0.0	0.0	0.0	0.0	0.0	0.0

Discordance d(bh;ai):	EV1(g1)	EV1(g2)	EV1(g3)	EV2(g1)	EV2(g2)	EV2(g3)
d(b2;a1)	0.0	0.0	0.0	0.0	0.0	0.0
d(b2;a2)	0.0	0.0	0.0	0.0	0.0	0.0
d(b2;a3)	0.0	0.0	0.0	0.0	0.0	0.0
d(b1;a1)	0.2	0.0	0.0	0.4	0.0	0.0
d(b1;a2)	0.0	0.0	0.0	0.0	0.0	0.0
d(b1;a3)	0.0	0.2	0.2	0.2	0.0	0.0

Credibility:	(ai;bh)	(bh;ai)	
cr(a1;b2)	0.8333	cr(b2;a1)	2.5
cr(a2;b2)	0.0	cr(b2;a2)	5.0
cr(a3;b2)	0.0	cr(b2;a3)	3.3333
cr(a1;b1)	2.5	cr(b1;a1)	1.6667
cr(a2;b1)	0.0	cr(b1;a2)	4.1667
cr(a3;b1)	2.5	cr(b1;a3)	0.8333

Classification:	Alternative	Pessimist	Optmist
a1	A	A	
a2	C	C	
a3	B	B	

The output contains: **Concordance  $c(ai;bh)$**  – (global concordance between alternative  $i$  and profile  $h$ ), **Concordance  $c(bh;ai)$**  – (global concordance between profile  $h$  and alternative  $i$ ), **Discordance  $d(ai;bh)$**  – (global discordance between alternative  $i$  and profile  $h$ ), **Discordance  $d(bh;ai)$**  – (global discordance between profile  $h$  and alternative  $i$ ), **Credibility Matrix**, **Classification Pessimist** (from the upper profile  $bn$  to  $b1$ , Class  $A > B > C...$ ), **Classification Optimist** (from the lower profile  $b1$  to  $bn$ , Class  $A > B > C...$ ).

### 3- References

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