

# Manual of a modified algorithm for creating a triangular graph in the ArcMap environment

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- The source code of both calculations (points and classification) has been modified to allow work with time (the calculation is repeated automatically)

## Input file

- the decisive element of the calculation is the imported input file from Excel (or another spreadsheet), which will contain the input data for the calculation
- the data must have a three-part structure
- for the calculation to work properly, it is necessary to follow the specified header format, which is as follows:

NAME_SK	NUTS_ID	P_2010_1	P_2010_2	P_2010_3	P_2011_1	P_2011_2	P_2011_3	P_2012_1	P_2012_2	P_2012_3
Belgicko	BE	10	8	13	12	9	15	13	11	17
Bulharsko	BG	7	4	11	8	6	12	10	8	14
Cesko	CZ	9	6	12	10	7	13	11	9	15
Chorvatsko	HR	8	6	10	10	9	14	12	11	16
Dansko	DK	13	11	16	14	13	17	14	11	18
Estonsko	EE	9	7	13	12	8	15	14	10	17
Finsko	FI	15	12	19	16	14	20	18	15	22
Francuzsko	FR	14	10	17	16	12	19	17	14	21
Holandsko	NL	11	8	15	12	10	18	15	12	20

where: X\_####\_Y (napr. P\_2010\_1), means:

- X – letter specifying the beginning of the header for the calculation (choice of letter is arbitrary)
- #### – a number that describes the calculation period - it does not have to describe it unambiguously, it is for a user orientation
- Y – parameter name (alphanumeric character without special characters): the name must be unique for each parameter from the three-part data structure
- sign “\_” – it is mandatory to preserve and serves as a separator of individual parts of the header


**!** the input file must also contain a link variable that correctly matches the input table with the polygon layer (e.g. NUTS\_ID)

## Calculation

- the data must be imported into the ArcMap environment and linked to the polygon layer using a link variable

### 1. Points

*ArcMap input form for the first calculation step:*



- Input layer – input layer (.shp) containing data for calculation
- Sheet name – the name of the sheet in Excel (most often Sheet1) imported into the attribute table of the input layer
- Name of first category – the name of first parameter in the header (e.g. 1)
- Name of second category – the name of second parameter in the header (e.g. 2)
- Name of third category – the name of third parameter in the header (e.g. 3)
- Reference category – category from the attribute table that will be assigned to the calculated values (e.g. NUTS\_ID)
  - helps to clearly identify the calculated points (e.g. by territory), see the results
- Output point layer – the name and repository of the output layer, which should contain the calculated position of individual points for all periods
- Auxiliary lines (optional parameter) – the name and repository of the output layer, which should contain the calculated position of individual lines for all periods
- Base triangle (optional parameter) – the name and repository of the output layer, which should contain the base triangle (only one)

- Up to three layers can be output, with the first two containing the calculated values of point and line parameters for all areas and selected parameters

*Output attribute table for the first step of the calculation:*

	FID	Shape *	Id	Ref ID	Period
▶	0	Multipoint	0	FR	2010
	1	Multipoint	0	HR	2010
	2	Multipoint	0	BE	2010
	3	Multipoint	0	BG	2010
	4	Multipoint	0	CZ	2010
	5	Multipoint	0	DK	2010
	6	Multipoint	0	EE	2010
	7	Multipoint	0	FI	2010
	8	Multipoint	0	NL	2010
	9	Multipoint	0	FR	2011
	10	Multipoint	0	HR	2011
	11	Multipoint	0	BE	2011
	12	Multipoint	0	BG	2011
	13	Multipoint	0	CZ	2011
	14	Multipoint	0	DK	2011
	15	Multipoint	0	EE	2011
	16	Multipoint	0	FI	2011
	17	Multipoint	0	NL	2011
	18	Multipoint	0	FR	2012
	19	Multipoint	0	HR	2012
	20	Multipoint	0	BE	2012
	21	Multipoint	0	BG	2012
	22	Multipoint	0	CZ	2012
	23	Multipoint	0	DK	2012
	24	Multipoint	0	EE	2012
	25	Multipoint	0	FI	2012
	26	Multipoint	0	NL	2012



**Ref\_ID:** contains the category from the original attribute table that was entered in the "Reference category" field

**Period:** contains a number that describes the calculation period

## 2. Classification:

- for the calculation it is necessary to have an equilateral triangle divided into zones
  - basic sample triangles are included in the folder
  - the user has the option to divide the triangle according to their own requirements in the ArcMap environment

*ArcMap input form for the second calculation step:*

2. Classification

◆ Zones

Category field

◆ Plotted points

Name of new field

◆ Layer to write categories

◆ Output Reference category

- Zones – the input layer of the created (selected) triangle, which contains the zones
- Category field – a category that describes the individual zones in the attribute table of the sample triangle
- Plotted points – the point layer created in the previous step
- Name of new field – name (prefix) of the newly created column, which will contain the assigned category from the triangle (e.g. types)
- Layer to write categories – the layer in which the results will be written (i.e. the zones of the triangle), most often the original layer entering the calculation
- Output Reference category – the name of the category that is used to match the calculated points from the first step of the calculation - the results are stored in columns and not in rows
  - it is the same category that was entered in the "Reference category" field in the first step of the calculation
- The output is the entry of the zones of the selected triangle in the attribute table, while a separate column is created for each period (the name of the newly created column consists of the name entered in "Name of new field", delimiter "\_" and the corresponding period)

*Output attribute table for the second calculation step:*

	FID	Shape *	NUTS ID	NAME LATN	typy 2010	typy 2011
▶	0	Polygon	FR	France	12	7
	1	Polygon	HR	Croatia	12	7
	2	Polygon	BE	Belgium	7	12
	3	Polygon	BG	Bulgaria	12	12
	4	Polygon	CZ	Czechia	12	12
	5	Polygon	DK	Danmark	7	7
	6	Polygon	EE	Estonia	12	12
	7	Polygon	FI	Finland	7	7
	8	Polygon	NL	Netherland	12	12

## Notes

- the output layer from the modified algorithm allows joint continuation within one layer or creation of several layers
  - the results from the first step of the calculation (points) are stored in one output file – this allows (according to the selected analysis) to sort the calculated points by period or by areas
- missing data in the attribute table is not an obstacle to the calculation (in any of the calculations)