

# ElectMach software

(user's manual)

## 1. Introduction

The computer program **ElectMach** is software for the quantitative analysis of election data. The program, which works with data formats xls and csv (import and export), or with graphics formats PNG and EPS (export), is designed for the calculation of **advanced election result statistics** (1. Indexes of effective number of parties – Rae, Herfindahl-Hirschmann, Laakso-Taagepera, Molinar, Dunleavy-Boucek, Banzhaf index, and ENRP; 2. Proportionality indexes - Loosemore-Hanby, Index of deformation, Gallagher's index, Rae's index, and Rose's index, **election simulations of mandate distribution** (quotas: Hare, Hagenbach-Bischoff, Droop, Imperiali, Modified Imperiali, Hare-Niemayer, automatic; and divisor; d'Hondt, Imperiali, Sainte- Lagüe, Modified Sainte-Lagüe, Danish, and Huntington; and **graphic methods** (segmented Nagayama diagrams and simplex representation). Lukaš Kutner took part in the software design.

## 2. Some of the simple operations carried out by ElectMach:

- a) analysis of electoral fragmentation at the level of voting districts (in the *first-past-the-post* system, for example)
  
- b) simulation of mandate distribution in proportional voting systems according to various electoral formulas
  
- c) comparison of how the same voting results are weighted under various indexes of proportionality (or effective number of parties)
  
- d) graphic representation of multiple simultaneous election contests

### 3. Using the system

After WinZip decompression, the application is opened through the file VolbyCZ. The program consists of three screens with a context menu: Data, Formulas, and Results. You can move between these screens via the menu Back-Next in the lower right corner of the screen.

The program can be used on a PC with the Java interface installed. In working with the program (menu "Data") it is necessary to import a prepared data matrix (select "Open") in the correct format (xls, csv) and form (line: single electoral contest, column: voting results for that contest). It is not yet possible to enter or edit data directly into the ElectMach program.

Data formats for individual calculations (menu Formulas) are as follows:

***Electoral divisors.*** standard matrices for election results, number and distribution of mandates either overall in the menu Formulas or by showing number of mandates in last column of matrix (if varying numbers of mandates are distributed to different districts).

***Election quotas.*** standard matrix for election results, number and distribution of mandates either overall in the menu Formulas or by showing number of mandates in last column of matrix (if varying numbers of mandates are distributed to different districts).

***Indexes of proportionality.*** Special format for data, form of cells is N1-N2, where N1 is votes and N2 mandates, these figures being separated by a dash (-). More than one index at a time can be selected

***Effective number of parties.*** standard election results matrix. More than one index can be selected at the same time.

***Graphics.*** screen 1. The program draws segmented Nagayama diagrams and simplex representation. For simplex representation, two parties must be selected (columns), which will be presented in the results as the main ones. It is optional

whether the result will be drawn in points or whether the % numbers will be pictured in the individual segments of the appropriate matrix.

**Saving.** [Menu results]: here the data will be saved in xls and csv files, and graphics in formats png and eps.

#### **4. Credits**

The computer program ElectMach is closed source freeware. The program was created thanks to grant 2003/2005 Mechanical and Psychological Effects of Electoral Systems (Fund for the Development of Higher Education, Ministry of Education, Youth, and Physical Fitness, CR).

For citation, please use the following bibliographical information:

<p>Chytilek, R. - Kutner L. (2005): <i>ElectMach, election software</i>, online version <a href="http://www.ispo.fss.muni.cz/electmach-1">www.ispo.fss.muni.cz/electmach-1</a></p>
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We welcome your comments about the program; please report any errors or recommendations for improvement to [chytilek@fss.muni.cz](mailto:chytilek@fss.muni.cz)