Applications of the mathematical theory of democracy
(Block-seminar for WS 2009/10)

Prof. Dr. Dr. Andranik Tangian. Tel: 0211 / 7778-259
Andranik-Tangian@boeckler.de
June 2, 2009

The scope

Mathematical theory of democracy is a branch of *Social Choice*. It deals with the evaluation of representatives and representative bodies. For this purpose, indices of representativeness are defined (popularity, universality, goodness). With these indices, a number of theoretical and practical problems can be solved.

Theoretical applications include Arrow's social choice model, multi-criteria decision making and some others.

Societal applications are: analysis of results of parliamentary elections, developing instruments for coalition-formation, justification of selection of magistrates by lot in historic democracies, evaluation of share-holders representation in enterprises, etc.

Non-societal applications are also possible, because some processes can be regarded as manifestations (representatives) of some other processes. Applications include: stock-exchange predictions, traffic control, etc.

Output

The seminar will be in English/German. At the end students have to write seminar essays (Seminararbeiten), ca. 20 pages long and to prepare an oral (PowerPoint) presentation for ca. 40 min. The seminar essays can be in any official EU language (German, English, French). Besides seminars, students can optionally attend lectures of the relevant course *Mathematical theory of democracy* on the same days as the seminar.

Successful students will be offered themes for diploma and doctor studies.

Socially engaged post graduate students will get recommendations for a grant application in one relevant German political foundation. The study can be combined with one-year leave for Brussels and Luxembourg within the IMPALLA program.

Time schedule

The time schedule for both block-seminar and block-course is as follows

- Fr 13 Nov 2009 (4 hrs):   4 hours lectures

  Sa 14 Nov 2009 (8 hrs):   4 hours lectures   +   4 hours seminars

- Fr 8 Jan 2010 (4 hrs):   2 hours lectures   +   2 hours seminars

  Sa 9 Jan 2010 (8 hrs):   4 hours lectures   +   4 hours seminars

- Fr 22 Jan 2010 (4 hrs):   2 hours lectures   +   2 hours seminars

  Sa 23 Jan 2010 (8 hrs):   2 hours lectures   +   6 hours seminars

----

18 hours lectures   +   18 hours seminars

Registration for the Course-seminar (Anmeldung)

Those who wish to attend the course and/or to take part in the seminars have to register before October 20, 2009 at the chair of Prof. Clemens Puppe: Mrs Monika Emanuel emanuel@wior.uni-karlsruhe.de . Tel: 0721 / 6083077

Selected publications of the lecturer on the given topic

Tanguiane, A.S. (1991) *Aggregation and Representation of Preferences. Introduction to Mathematical Theory of Democracy*. Berlin: Springer-Verlag, IX, 331 pp.

Tanguiane, A.S. (1993) Inefficiency of democratic decision making in an unstable society. *Social Choice and Welfare*, 10 (3), 249–300.
http://www.springerlink.com/content/v17511737050pgp6/fulltext.pdf

Tanguiane, A.S. (1994) Arrow's paradox and mathematical theory of democracy. *Social Choice and Welfare*, 11 (1), 1–82.
http://www.springerlink.com/content/w4537358645242u1/fulltext.pdf

Tangian, A.S. (1997) Election of vice-president and adding new members to representative Bodies. *Social Choice and Welfare*, 14 (1), 23–45.
http://www.springerlink.com/content/nbqqq852bp29mvrh/fulltext.pdf

Tangian, A.S. (1997). An outline of the mathematical theory of democracy and its Applications. *Group Decision and Negotiation*, 6 (3), 205–230.

Tangian, A.S. (2000) Unlikelihood of Condorcet's paradox in a large society. *Social Choice and Welfare*, 17 (2), 337–365.
http://www.springerlink.com/content/uecn710ltqepb9aq/fulltext.pdf

Tangian A.S. (2003) *Combinatorial and Probabilistic Investigation of Arrow's Dictator*. FernUniversität Hagen: Discussion Paper 336, 85 pp.

Tangian A.S. (2006) *Decision making in politics and economics: 2. Model of German parliamentary elections 2005*. University of Karlsruhe, Discussion Paper 670 http://www.wior.uni-karlsruhe.de/LS_Puppe/Personal/Papers-Tangian/decmakpolecon.pdf (Forthcoming in *European Journal of Operational Research*)

Tangian A. (2007) Selecting predictors for traffic control by methods of the mathematical theory of democracy. *European Journal of Operational Research*, 181, 986–1003.

Tangian A. (2008) Predicting DAX trends from Dow Jones data by methods of the mathematical theory of democracy. *European Journal of Operational Research,* 185, 1632–1662.

Tangian A. (2008) A mathematical model of Athenian democracy. *Social Choice and Welfare,* 31, 537–572.
http://www.springerlink.com/content/h5j34647k4427482/fulltext.pdf