

MCDA 68

Chania, October 2-3, 2008

Selfduality in Spiritual Growth. Conflict Resolution.

Lavoslav Čaklović

University of Zagreb, Croatia

caklovic@math.hr

Contents

1	Goal oriented thinking	3
2	Hierrarchy of a GOT	4
3	Preference graph – buying a house	5
4	Duality	7
5	Self–duality	8
6	A conflict	9
7	Conflict resolution	10
8	Fixed point	11
9	Projects	12

1 Goal oriented thinking

A mathematical model of the **goal-oriented thinking (GOT)** is described. The mathematical concept of the basic notions: **criteria, decision graph, hierarchy, duality and self-duality** is introduced and explained. The mental process of the conflict resolution in spiritual growth is considered as an application of Potential Method which provides the convergence of iterative correction of a mental conflict.

2 Hierarchy of a GOT

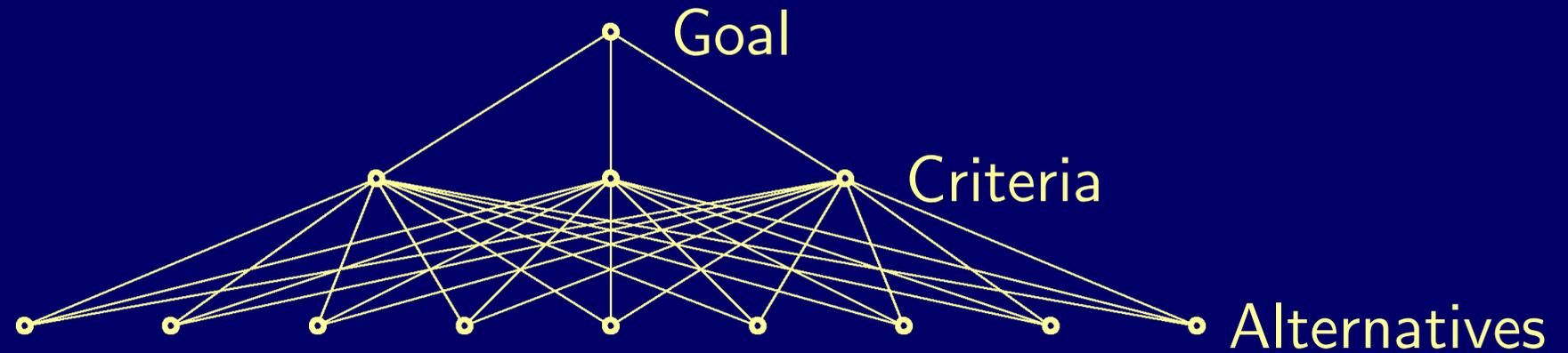


Figure 1: Typical hierarchy of a GOT.

- Possibilities (**alternatives**) are at the bottom of that hierarchy.
- The main goal is on the top, followed by criteria.
- Criteria can have sub-criteria...
- ...and can be time dependent.

3 Preference graph – buying a house

Criteria: Price, Distance from working place and Quality.

Alternatives: A, B, C, D. (houses)

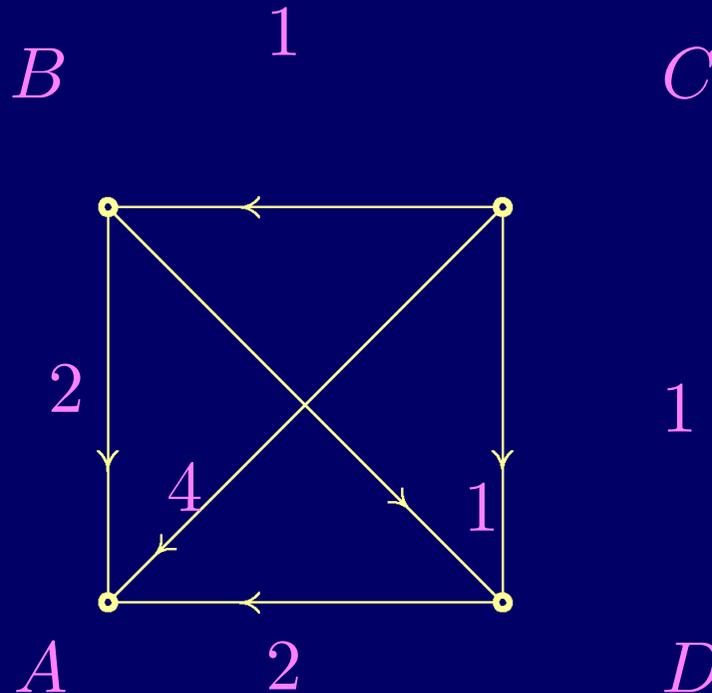


Figure 2: Preference graph for Price.

Pref. scale: 0-indif, 1-weak, 2-moderate, 3-strong, 4-absolute

File Edit View History Bookmarks Tools Help Music Yoga Photo Info Metafizika

http://metpot/cgi-bin/dataManip.pl?action=edit;e Google

Editing project: Price

Change preferences if you want.

level1:aimlevel

uncomparable	BuyHouse										uncomparable	
<input type="radio"/>	A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	B	<input type="radio"/>
<input type="radio"/>	A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	C	<input type="radio"/>
<input type="radio"/>	A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	D	<input type="radio"/>
<input type="radio"/>	B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	C	<input type="radio"/>
<input type="radio"/>	B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	D	<input type="radio"/>
<input type="radio"/>	C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	D	<input type="radio"/>

process save

Recommended resolution: 1024x768 or higher

Done 0:210

Figure 3: Input data for Price in pairwise dialog.

4 Duality

literary Double, dual, twofold, opposed to one item (singular);

mathematics Dual objects are the functions defined on the set of objects being measured.

decision Dual objects are criteria, you may think of them as the observed quality of primal objects. In hierarchical presentation dual objects are at the level above the level under consideration (see Figure [hierrarchy](#)).

5 Self-duality

- ...arises when alternatives are also criteria for themselves.
- An example of self-duality is when a group of decision makers attempt to rank themselves.
 - Each one of them creates his own preference graph over the set of group members, including himself.
 - Those preference graphs are then conjoined in one unique graph and the group (conjoint) ranks are then calculated.
 - They can do that using some criteria.
- Another example is re-evaluation of the Federal budget...
- ...and conflict resolution.

6 A conflict

Frequently, our **life goals** are unambiguous or even unknown. Instead, we are ruled by some vague principles and habits that may even lead to a **conflict**. Moreover, slight change of aims' weight can change the ranking of alternatives. A mathematical term for that situation is **instability**. When this happens, we do one of the following:

1. reconsider the importance of our principles and goals,
2. reject or introduce new principles and repeat the process.

The first one^a will now be carefully analyzed. From the mathematical point of view this is a very interesting situation and leads to the fixed point problem from nonlinear analysis.

^aThe second one is of no interest for mathematician. Moreover, it should happen that introducing/rejecting a new principle will not be possible anymore. The first case then becomes interesting again.

7 Conflict resolution

- Presence of instability cause reconsidering of the goals from the point of view of actions.
- For each action there are some goals that support those actions more than others.
- Each action makes its own preference graph over the set of goals, and indirectly, each goal defines preferences on the set of goals
- i.e. **goals are ranking goals:**

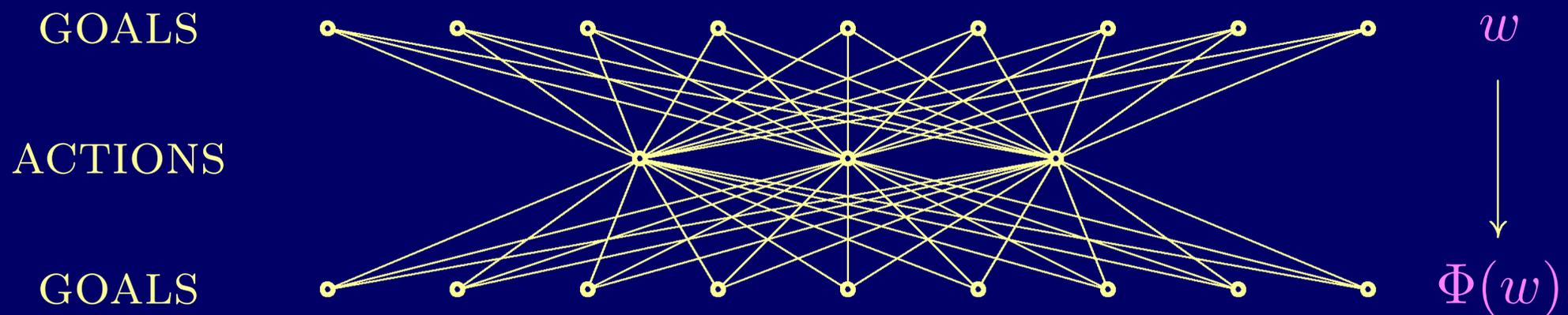


Figure 4: Selfduality.

8 Fixed point

Theorem 1 *Let X denotes the matrix of group potentials and suppose that*

$$2 \ln a \|X\|_{\infty} < 1 \quad (1)$$

Then, Φ_X is a contraction.

Theorem 2 *Let us suppose that $1 \notin \sigma(\Phi'_X(\xi))$, σ denotes the spectrum, for all $\xi \in \text{Aff}(\Sigma)$. Then, $\Phi_X : \Sigma \rightarrow \Sigma$ has a unique fixed point.*

An example

9 Projects

DEA versus PM:

1. ranking all DMUs (city banks of China)
<http://decision.math.hr/examples/>
2. ranking efficient DMUs only (submitted)

Future project.

1. Triplets <http://decision.math.hr/programs/triplets/>
2. New algorithm on graphs