Discrete Choquet integral and multilinear forms (topic presentation)

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Background

- In decision making, a need to evaluate multiple alternatives w.r.t. different criteria is quite common

- To represent the value of an alternative, the information gained from multiple criteria needs to be *aggregated* into one single value
  - → aggregation functions

- Lots of different kinds of aggregation functions exist
  - → the most common is the weighted arithmetic mean

Background

- The most basic aggregation functions often require the criteria to be independent
  - → Representing many preference relations is not possible

- This usually is not the case and it might be desirable to be able to also model the interactions between criteria
  - → The Choquet integral and Multilinear forms

The Choquet integral and Multilinear forms

- In Choquet integral and Multilinear forms weights are also assigned for subsets of criteria
  - If these weights for subsets of criteria are defined as zero, no criteria interaction is taken into account and both methods narrow down to <u>weighted arithmetic mean</u>

- i.e. both methods can be seen as a generalization of the weighted arithmetic mean

Objectives and scope

- The objective of this thesis is:
    - to present the problem of multicriteria decision making in the perspective of criteria interaction
    - provide a comprehensible introduction to Choquet integral and Multilinear forms
    - conduct a qualitative comparison between these two methods and examine their feasibility with portfolio selection

Literature

- Grabisch M. (1996), The application of fuzzy integrals in multicriteria decision making, *European Journal of Operational research, 89, 445-456*

- Grabisch M. and Labreuche C. (2010), A decade of application of the Choquet and Sugeno integrals in multi-criteria decision aid, *Annals of Operations Research, 175, 247-286*

- Keeney, R. L. and Raiffa, H. (1976), Decisions with Multiple Objectives: Preferences and Value Tradeoffs, *Wiley, New York*

Schedule

End of summer	Familiarization with the topic
9/2013	Exploring the literature, beginning to write the thesis
30.9.2013	Topic presentation
12/2013	Thesis ready, final touches
13.1.2014	Presentation of the finished thesis