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Stochastic Preference and Group Decision

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Abstract

In this article a notion of stochastic flow associated to stochastic preference is introduced. It is proved that stochastic flow is a consistent flow if and only if stochastic preference is consistent. If both of them are consistent, the flow and the stochastic preference, then, the normal integral of the flow is the logarithm of value function associated to stochastic preference flow. This means that normal integral of stochastic preference flow, which always exists, can be considered as a generalization of ordinal value function in that context. It is also proved that if flow preference is a weak preference order, then, normal integral of unimodular stochastic flow is a value function.

This approach is applied to the data obtained from a web questionnaire when students were asked to give preference flows for certain criteria over the set of their lecturers. In that case the stochastic flow and the group flow generate equivalent ranking. Finally, we calculated the Condorcet's flow and Savage's value function associated to its unimodular flow. The ranking obtained from Condorcet's flow is not equivalent to ranking obtained from stochastic flow.

In this article we show that stochastic flow and group flow from Čaklović (2003b) generate equivalent ranking (see Tables 2 and 3). That means that in situations when only rating is the aim of the experiment one can organize a questionnaire to collect data only for stochastic flow, i.e. using the scale $-1, 0, 1$. This is less time consuming than giving strength of a preference for each pair of alternatives.

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