

Aggregation of correlated judgments on multiple interconnected propositions

○Japan Society for the Promotion of Science /

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1. Aim

We consider the situation where a group has to make a collective decision on logically connected issues. Issues are classified into premises and a conclusion. In this presentation, considering the correlation among individuals' judgments, we draw a comparison between the performance of premise-based procedure (PBP), which considers only the individuals' judgments on premises and combines them using a given logical connection rule and conclusion-based procedure (CBP), which considers only the individual judgments on a conclusion.

2. Model

While List (2005) assumes that each individual makes a decision independently, we construct a mathematical model in which individuals' judgments are correlated, referring to Boland et al. (1989).

3. Results

For the fixed individuals' competence, when the degree of correlation among individuals' judgments is high or the number of issues in which individuals are involved is large, a logically inconsistent set of collective judgments is likely to occur. Moreover, we found that the probability of PBP reaching the correct conclusion always converges to 1 as the group size goes to infinity while that of CBP fails to under some conditions.

4. Conclusion

Firstly, we find the conditions for the occurrence of an inconsistent set of collective judgments. Secondly, we show the robustness of PBP against the existence of correlation among individuals' judgments in the terms of accuracy of the collective decision. The second result implies that PBP is compatible with deliberative democracy.

References

Boland, P.J., Proschan, F., Tong, Y.L. 1989. "Modelling dependence in simple and indirect majority systems." *Journal of Applied Probability*, 26, 81-88.

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