Extension to optimal bidding

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# Introduction

This document proposes a mechanism to find a good concession bid, based on the optimal bidding strategy (1).

The optimal bidding strategy is a bidding strategy that determines a the optimal bid for a given time t by using a specific function u(t) that gives the optimal target utility for that time t, and then finding a bid with that utility on the pareto frontier. This approach always gives one bid, and it is either equal to the previous bid, or a concession.

The proposal here extends this approach, by not only considering this optimal bid but also nearby bids that may better fit the opponent’s goals.

# Considering nearby bids

For clarity, we consider the bidding from the standpoint of a bot. The bot is negotiating with a human and the bot needs to determine its next bid.

We extend the optimal-bidding strategy as follows (Figure 1):

1. Determine the bot’s target utility for the optimal bid
2. Determine the bid on the pareto that is closest to the optimal target utility for the bot.
3. Create a set C with all possible concessions: the bids that have a bot utility between (including) the optimal bid and the bot’s previous bid, and a human utility higher or equal to the bot’s previous bid.
4. Determine the bid in this concession set C that has the smallest hamming distance to the human’s last bid[[1]](#footnote-1).

system1:Users:wouter:Desktop:concessionbids.eps

Figure . The possible concessions area.

# References

1. T. Baarslag, What to Bid and When to Stop. Dissertation, Delft University of Technology, 2014. ISBN 978-94-6186-305-8

1. The hamming distance between bid A and B is the number of bid issues that have different values in A and B. [↑](#footnote-ref-1)