CS390 Computational Game Theory and Mechanism Design July 20, 2013

Problem Set 5

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1. From the description we know that if $o \in f^{CON}(\theta)$, then for any o', a weak majority of players think o is better than o'. Now after the players have changed their true type profile, the players who had thought o is better than o' still agree with their previous view. So there are still a weak majoraty of players thinks o is better than o'. Thus f^{CON} is monotone.

2. It's not monotone. Suppose originally player 1 get $(3, 1)$ and player 2 get $(2, 2)$ and player 3 get $(1, 3)$. After the change player 1 get $(3, 1)$ and player 2 get $(1, 2)$ and player 3 get $(2, 3)$, then it satisfies the lower contour property, but player 1 is not the winner any more. So it is not monotone.

3. It's not monotone. Let's consider a good outcome. In this outcome, the winner get negtive utility, then no matter he lower his valuation, his lower contour won't change. But when he change his valuation to the value that lower than any other player's valuation, he is still the winner while not having the highest valuation, this is not a good outcome. So this social correspondence is not monotone.