Thomas Kesselheim
Alexander Braun

February 4, 2021

Algorithmic Game Theory

Winter Term 2020/21

Tutorial Session - Week 12

Exercise 1:
The cake cutting protocol *cut and choose* for two agents can also be considered as a direct mechanism: Both agents simultaneously report a valuation density function $b_i \colon [0,1] \to \mathbb{R}_{\geq 0}$ for $i = 1, 2$. Afterwards, the mechanism cuts the point t such that $\int_0^t b_1(x)dx = \int_t^1 b_1(x)dx = \frac{1}{2}$. Then it allocates that piece of $[0, t)$ and $[t, 1]$ to agent 2 that maximizes her declared value leaving the other piece for agent 1.

Prove that the given mechanism is not DSIC.

Exercise 2:
Consider the ranking rule which we obtain from plurality voting by ordering the candidates by decreasing number of votes. Prove that this ranking rule is not independent of irrelevant alternatives (IIA).

Note: Do not use Arrow's theorem in order to solve this exercise.