Microeconomics II (PhD)
Tutorials 1 and 2, April 20 and 22

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Exercises:

1. Solve Exercise 23.C.4 in Mas-Colell, Whinston and Green (MWG).
2. Solve Exercise 23.C.8 in MWG.
3. Solve Exercise 23.C.11 in MWG.
4. Solve Exercise 23.B.4 in MWG.
5. Solve Exercise 23.D.1 in MWG.

In addition, please prepare for the second tutorial on April, 22 the following exercises:

6. Solve Exercise 23.C.10 in MWG.

   Assume throughout the exercise that (23.C.8) is a necessary condition for $(k^*, t_1, ..., t_I)$ to be truthfully implementable in dominant strategies. In part c insert "implementable" before "ex post efficient social choice function" and suppose that $V_i(\theta_{-i})$ is I times continuously differentiable for each i.

7. Suppose there are two agents and the question whether a brigde should be built. The net valuation of agent i for having a bridge is θ_i, which is independently and uniformly distributed on [-3,3]. Utilities are quasi-linear: agent i gets utility $\theta_i + t_i$ if the bridge is built and t_i otherwise, where t_i denotes the transfer he receives.
   (a) Assume agents can either vote in favor or against the bridge and there are no transfers. The bridge will be built if and only if both agents vote for it. What is an equilibrium in dominant strategies? If agents follow these strategies, what is the expected aggregate utility (that is, the sum of the agents expected utilities)?
   (b) Suppose that agents' valuations were observed by a utilitarian social planner. Which decision rule should he implement and what is the resulting expected aggregate utility?
   (c) Assume that transfers are feasible. What is the expected aggregate utility if the Pivotal mechanism is implemented?

8. Consider a binary public good setting (see Example 1 from the lecture, slide 12) with 2 agents and suppose $\Theta_i = \mathbb{R}$ for $i = 1, 2$.
   (a) Show that there exists no VCG mechanism such that $\sum_i t_i(\theta) = 0$ for all $\theta \in \mathbb{R}^n$.
   (b) *Verbally:* The above result extends to n agents. What can you conclude from this for general private value settings (that is, not only binary public good settings) if all valuations are possible, i.e. $\{v_i(\cdot, \theta_i) | \theta_i \in \Theta_i\} = \mathcal{V}$?