

Econ 711 – Fall 2020 – Problem Set 4

Due online Monday night October 5 at midnight.

Please feel free to work together on these problems (and all homeworks), but each student needs to write up his/her own answers at the end, rather than directly copying from one master solution.

Question 1. Choice rules from preferences

Let X be a choice set and \succsim a complete and transitive preference relation on X . Show that the choice rule induced by \succsim ,

$$C(A, \succsim) = \{x \in A : x \succsim y \ \forall y \in A\}$$

must satisfy the Weak Axiom of Revealed Preference (WARP).

Question 2. Preferences from choice rules

Let X be a choice set and $C : \mathcal{P}(X) \rightarrow \mathcal{P}(X)$ a nonempty choice rule. Show that if C satisfies WARP, then the preference relation \succsim_C defined on X by

$$x \succsim_C y \quad \text{if and only if} \quad \text{there exists a set } A \subseteq X \text{ such that } x, y \in A \text{ and } x \in C(A)$$

is complete and transitive, and that the choice rule it induces, $C(\cdot, \succsim_C)$, is equal to C .

Question 3. Choice over finite sets

Let X be a **finite** set, and \succsim a complete and transitive preference relation on X .

- (a) Show that the induced choice rule $C(\cdot, \succsim)$ is nonempty – that $C(A, \succsim) \neq \emptyset$ if $A \neq \emptyset$.
- (b) Show that a utility representation exists.

(Hint: for part (a), fix X finite, and prove that for $A \neq \emptyset$, $C(A, \succsim) \neq \emptyset$ by induction on the number of elements in the set A . For part (b), use induction on $|X|$ to prove the stronger result that when X is finite, a utility representation exists with range $\{1, 2, \dots, |X|\}$.)