Prof. Ross Starr

Problem Set 4 – part 1

It's OK to work together on problem sets.

1. Starr's *General Equilibrium Theory*, problem 7.2 (should be the same in 1st and 2nd editions).

2. Consider an Edgeworth Box for two households. The two goods are denoted x, y. The households have identical preferences:

$$(x, y) \succ (x', y') \quad \text{if} \quad 2x + y > 2x' + y', \quad \text{or}$$
$$(x, y) \succ (x', y') \quad \text{if} \quad 2x + y = 2x' + y' \quad \text{and} \quad x > x'.$$
$$(x, y) \sim (x', y') \quad \text{only if} \quad (x, y) = (x', y').$$

They have identical endowments of (10, 10). Find the Pareto efficient set of allocations. Find the contract curve. Demonstrate that there is no competitive equilibrium. Is this example a counterexample to Theorem 7.1 (does it demonstrate that Theorem 7.1 is false?) ?

3. Assume P.II, P.III, P.IV, but not P.I (convexity) of Starr's *General Equilibrium Theory*. Demonstrate by example that Theorem 8.1 may not hold.

4. Consider an Edgeworth Box for two households. The two goods are denoted x, y. The households have identical preferences described by the utility function

$u(x, y) = \sup [x , y]$. Where sup indicates the supremum or maximum of the two arguments. Demonstrate that these preferences are nonconvex, do not fulfill any of the three forms of Starr's *General Equilibrium Theory* C.VI.

The households have identical endowments of (10, 10). Find the Pareto efficient set of allocations. There is a competitive equilibrium in this example (how is this possible considering the violation of C.VI?). Find it. Show that it is Pareto efficient.