Problem Set on GE

1. Suppose that individual demands are derived from utility maximization, where each consumer's wealth is the value of her endowment. State a condition on preferences that guarantees Walras law, and prove your claim.

2. Suppose now that in the framework of problem 1, wealth is transferred by some kind of tax scheme from consumer to consumer in a manner determined by equilibrium prices: $t_{ij}(p)$ is the wealth transferred from consumer i to consumer j at market prices p. What conditions on transfers, along with your answer to the first problem, guarantee Walras law?

3. Suppose that a pure exchange economy has I consumers. Consumer i has Cobb-Douglas preferences for two goods, $u_i(x, y) = x^{\alpha_i} y^{\beta_i}$, and an endowment vector $(e_x^i, e_y^i) > 0$. Compute the competitive equilibrium.

4. Suppose two consumers have Leontief preferences, $u_i(x, y) = \min\{\alpha_i x, \beta_i y\}$, and semi-positive endowments. Draw some Edgeworth boxes to demonstrate the the possibilities for equilibrium.

5. Suppose that the aggregate technology set Y is closed and convex, and has non-empty interior, and that y^* is producer-efficient. Demonstrate that there exists a non-zero price that maximizes aggregate profits.

6. In the framework of the preceding problem, suppose that the production of each commodity is described by a concave production function. What has to be true about the marginal rate of transformation for the profit-maximizing price to be strictly positive?

7. Suppose that production of a final good uses only labor. Production for each firm is described by a C^1 and concave production function $f : \mathbf{R}_+ \to \mathbf{R}_+$ with $f(0) = 0$. Suppose that $f'(0) = b$. Suppose n firms engage in production. Describe the aggregate production possibility set. What happens to this set as n becomes large? Suppose that $f(x) = \sqrt{x}$. What does the production possibility set look like for large n?