Summary of L4

Guoxin SUI

2017 Fall

1 Linear Utility Market Equilibrium

- The elements of "Linear Utility Market" :
    - m agents with initial endowment w
    - n goods
    - utility vector u
    - Price vector p

- Linear Market Equilibrium
    - Budget constraint for agents
    - Individual optimality
    - Market clearance

- Nomalization
    - Everything is owned by someone
    - Everything is liked by someone
    - Each item is of unit size.

- Atomatization
    - Every agent owns one item
    - Every item is owned by one agent.
    - Each item is of unit size.

- Demand Graph : Non-zero indegree
    - V: Each item with associated agent is a node
    - E: An edge from $i \in V$ to $j \in V$ if agent i likes item j.
    - Edge weight $uij : u_i(x) = \sum_{ij) \in out(i)} u_{ij} x_{ij}$

2   Linear Utility Fisher Market

- The elements of "Linear Utility Market" :

    - m agents with initial endowment m
    - n goods
    - utility vector u
    - Price vector p

- Linear Market Equilibrium

    - Budget constraint for agents
    - Individual optimality
    - Market clearance

- Eisenberg-Gale's Program for Fisher Market

    - $max \sum_i m_i log u_i$
    - $\forall i : u_i \leq \sum_j u_j^i x_j^i$
    - $\forall \sum_i x_j^i \leq 1$
    - $\forall x_i \geq 0$
    - construct the Lagrangian to solve the problem.