EC202 Seminar
Week 4
Covering Materials from Week 2

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Key Concepts

- Exogenous parameters
  - Initial allocation
  - Preference
- Endogenous parameters
  - Post-trade allocation
  - Price of each good
- Pareto efficiency
  - Market clearing
  - Excess demand/supply
  - Feasible set of allocations
  - Pure exchange economy
  - Pareto optimality

In-class Question

Q3. Consider a 2×2 pure exchange economy where the initial endowment is $\mathbf{e}_A = (3, 2)$,$\mathbf{e}_B = (2, 1)$ and preferences represented by $u_A, u_B : \mathbb{R}^2_{\geq 0} \to \mathbb{R}$ given by

$$u_A(x_{A1}, x_{A2}) = \frac{x_{A1}}{4} + \ln(1 + x_{A2}) \qquad u_B(x_{B1}, x_{B2}) = x_{B1}x_{B2}$$

a) Draw indifference curves on an Edgeworth box and verify that preferences are convex.

b) Calculate Marginal Rates of Substitution for both agents and evaluate them at the initial endowment.

c) Use b) to draw indifference curves through the initial endowment and on your Edgeworth box depict a lens of allocation that Pareto dominates the initial endowment.

d) Argue that we can find an allocation that Pareto dominates the initial endowment by having Andy give Bob 0.6ε good 2 in exchange for ε more good 1 for some small $\varepsilon > 0$. Test this by setting $\varepsilon = 0.1$ and calculating utilities at $\mathbf{x}_A = (3.1, 1.94)$,$\mathbf{x}_B = (1.9, 1.06)$. You should find this Pareto dominates the initial endowment and give some intuition for this.

e) Find the Pareto Set and depict it on your Edgeworth box.

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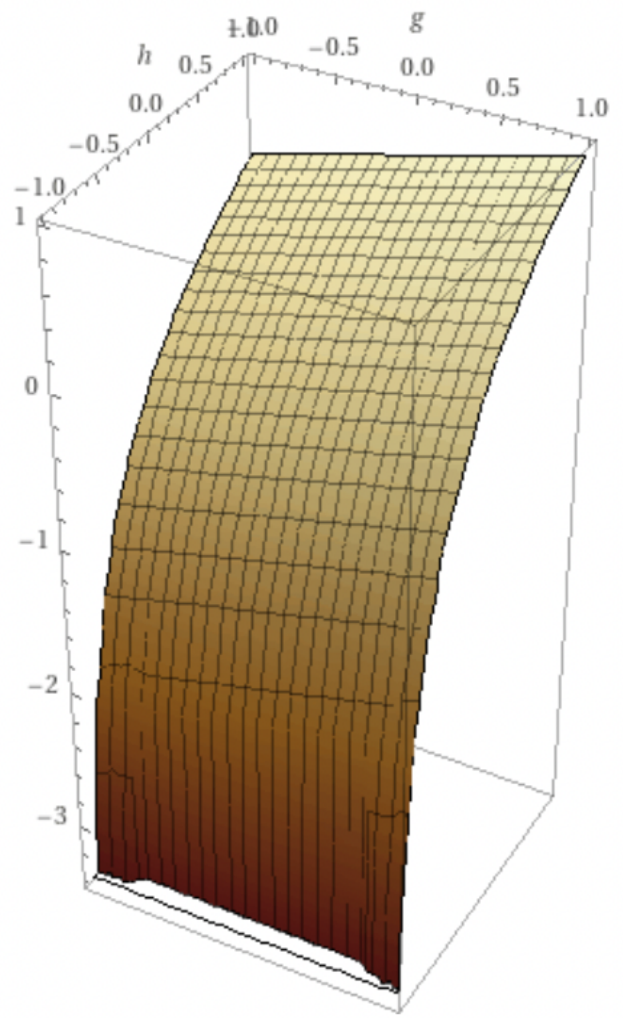
a) Draw indifference curves on an Edgeworth box and verify that preferences are convex.

WolframAlpha.com

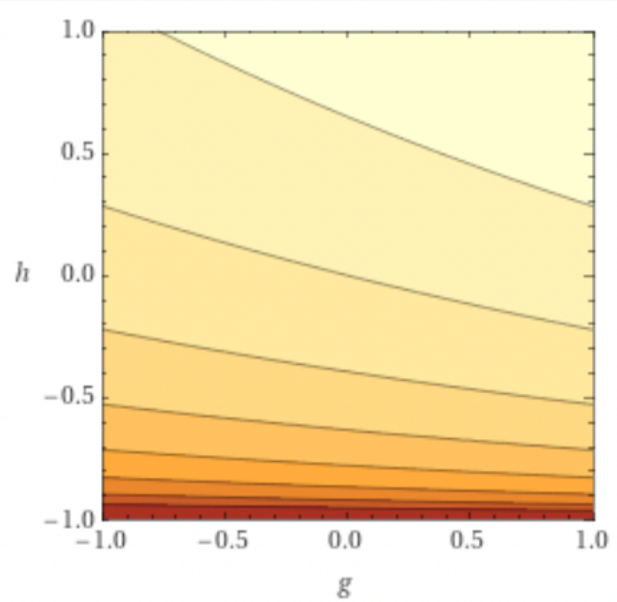
Input

$u(g, h) = \frac{g}{4} + \log(1 + h)$

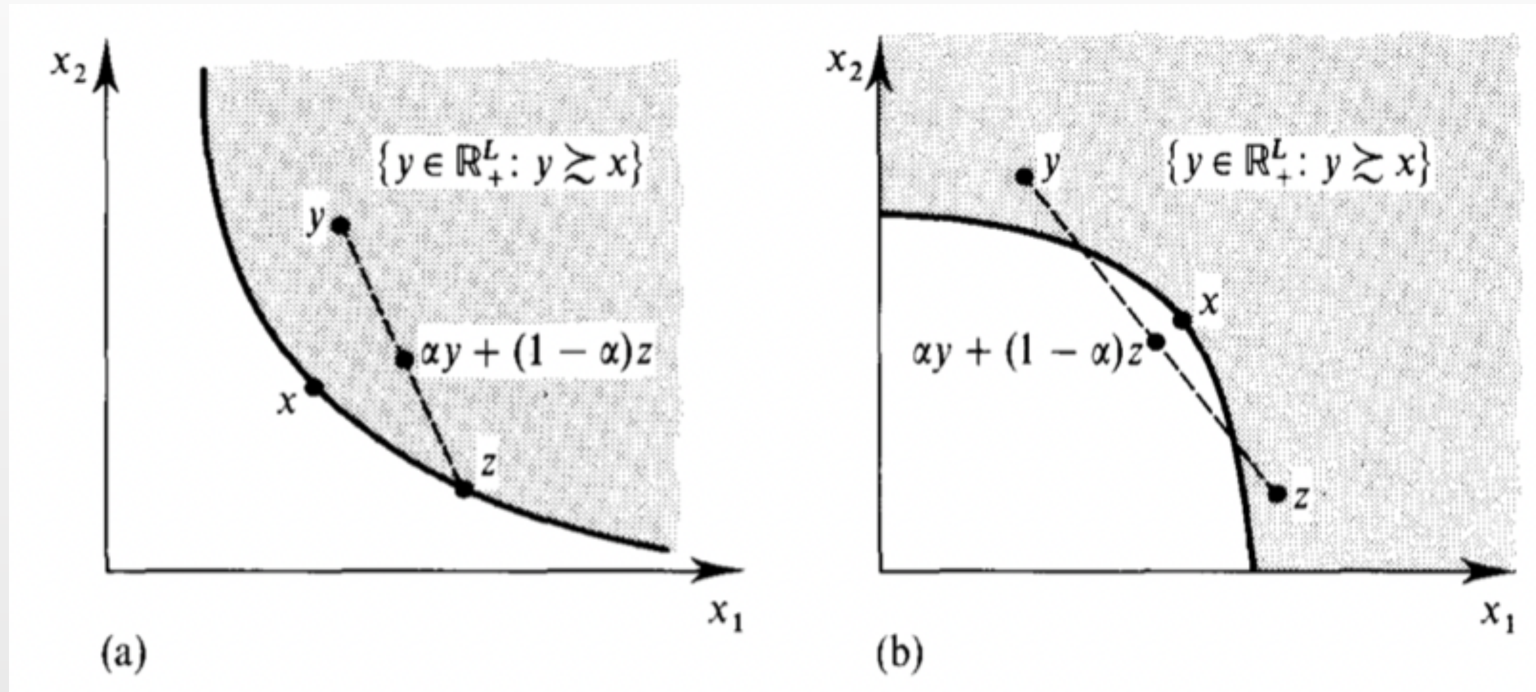
3D plot



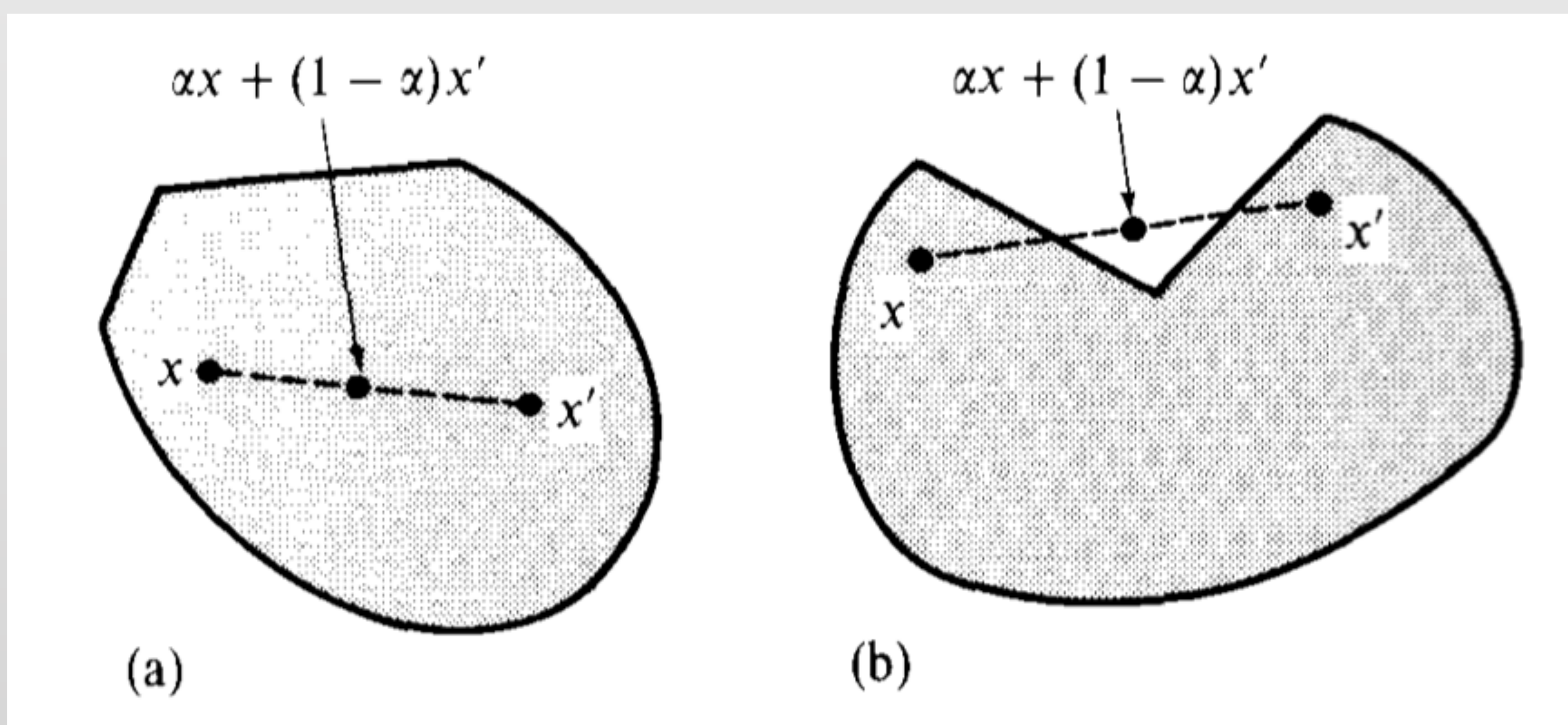
Contour plot



Definition 3.8. Convex preferences: For every $\mathbf{x} \in X$, the upper contour set $\{\hat{\mathbf{x}} \in X \mid \hat{\mathbf{x}} \succeq \mathbf{x}\}$ is a convex set. In other words, if $\hat{\mathbf{x}} \succeq \mathbf{x}$ and $\overline{\mathbf{x}} \succeq \mathbf{x}$ then $\alpha\hat{\mathbf{x}} + (1-\alpha)\overline{\mathbf{x}} \succeq \mathbf{x}$ for any $\alpha \in [0,1]$



Definition M.G.1: The set $\boldsymbol{A} \subset \mathbb{R}^N$ is convex if $\alpha x + (1-\alpha)x' \in A$ whenever $x, x' \in A$ and $\alpha \in [0,1]$.



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e) Find the Pareto Set and depict it on your Edgeworth box.

Q4. Consider a 2×2 pure exchange economy where there is 2 units of good 1 and 1 unit of good 2 in the economy. Let preferences be represented by $u_A, u_B : \mathbb{R}^2_{\geq 0} \to \mathbb{R}$ given by

$$u_A = \min\{x_{A1}, x_{A2}\} \quad u_B = \min\{x_{B1}, x_{B2}\}$$

a) Find the Pareto Set and illustrate it on an Edgeworth box.
b) Discuss why the Pareto Set takes the form it does.