MATLAB: Session 2

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Market Equilibrium Without FOCs

Core Problem: Perfectly Competitive Exchange Economy

- Two consumers: A,B
- Two goods: x_1, x_2
- Utility: $[x_1^r + x_2^r]^{\frac{1}{r}}$
- Endowments: $\{(y_1^A, y_2^A), (y_1^B, y_2^B)\} = \{(10, 5), (5, 40)\}$

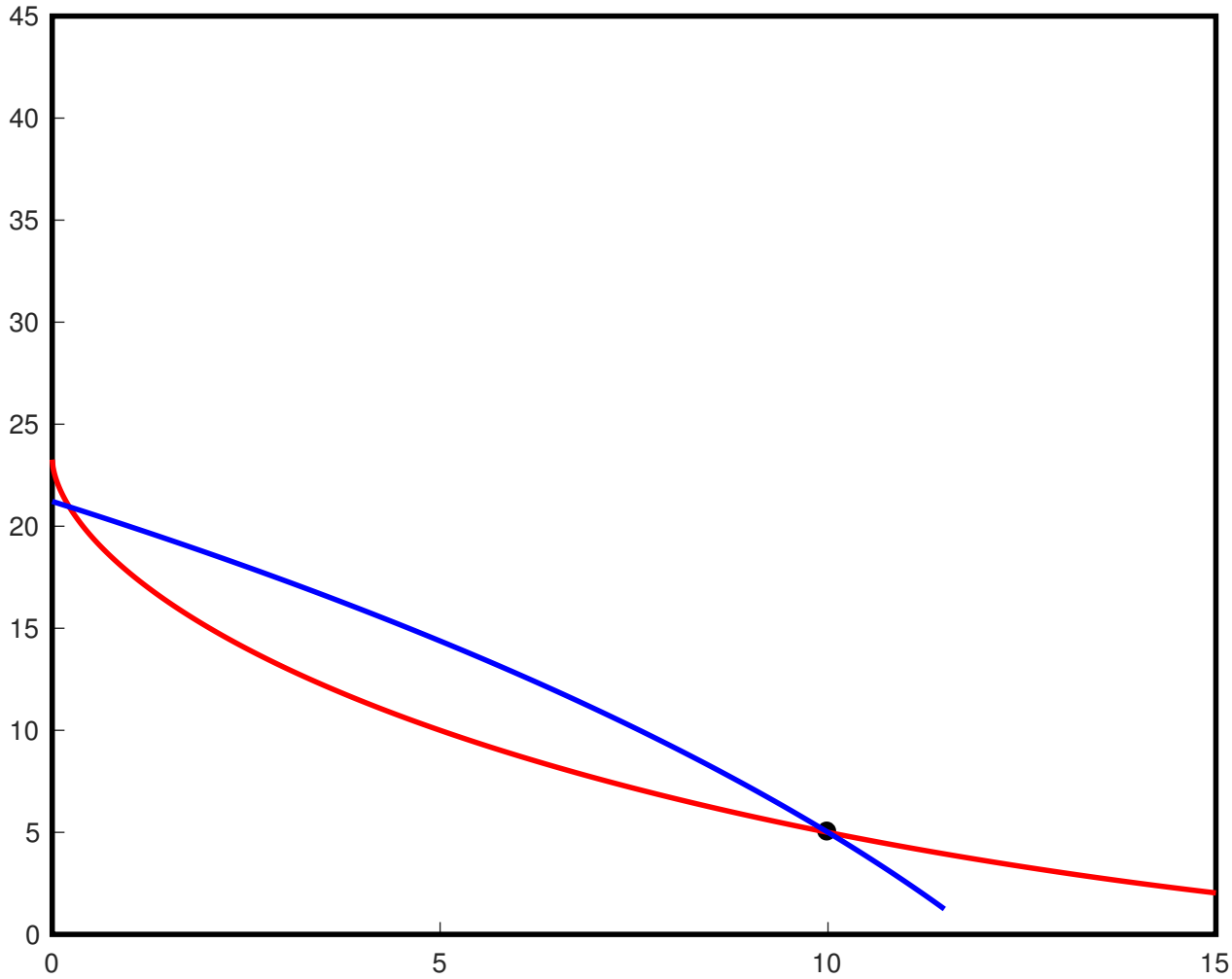
GOAL: Find equilibrium prices and allocation

TOOLS: Dynamic Programming

Outline of Process

1. Construct Edgeworth Box
2. Draw Indifference Curves at endowment
3. Calculate individual demands given prices
4. Draw individual demand points on Edgeworth Box
5. Calculate Total Demand (fixed supply) given prices
6. Find equilibrium prices and allocations

Step 1: Draw Edgeworth Box



Step 2: Construct Indifference Curves

- cesutility.m
- cesindiff.m
- Make two new functions with r as given, not as argument
- Find utility of Agent A at endowment point
- Draw indifference curve through the endowment point

Practice 1: Plot indifference curve for B

HINT: What does a point in the box represent?

Practice 2: Plot budget constraint of Agent A

Step 3: Derive Individual Demands

$$\max_{x_1, x_2} [x_1^r + x_2^r]^{\frac{1}{r}}$$

$$s.t. x_1 p_1 + x_2 p_2 \leq y_1 p_1 + y_2 p_2 \equiv m$$

Useful matlab function: fmincon

fmincon(fun,x0,A,b)

- What is the objective?
- What is A? What is b?
- What is a good guess?

Step 4: Demand in Box

Practice 1: Make a new box, with the endowment point, the budget constraint, and two demand points

Practice 2: Add indifference curve at each of individual demand points.

Step 5: Total Demand

Construct a function that calculates total demand for both goods.

Practice 1: Draw the demand curve on a graph

Practice 2: Add the supply curve to the graph

Step 6: Find Equilibrium Prices and Allocation

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Practice 1: Draw equilibrium point and the Indifference Curves

Practice 2: Run code for $r = 0.2$ and $r = 0.9$. What is the difference? What is the intuition for it?