

中微第二次作业

1 Multiple-choice

1-5: CBBBE

2 Short-answer

6.

$$(1) \quad X = 1, Y = 8 \\ U = 4 \ln 2 + 8 = 10.77$$

$$(2) \quad X = 0.5, Y = 0 \\ U = 4 \ln \frac{3}{2} = 1.62$$

(3)

$$X = \frac{3}{P} \quad \text{when } 0 < P < 1 \\ X = \frac{4}{P} - 1 \quad \text{when } 1 \leq P \leq 4 \\ X = 0 \quad \text{when } P > 4$$

7.

(1)

$$X_1 = \frac{mP_2}{P_1(4P_1+P_2)}$$

$$X_2 = \frac{4mP_1}{P_2(4P_1+P_2)}$$

$$(2)$$

$$X_1 = \frac{ma}{P_1(a+b)}$$

$$X_2 = \frac{mb}{P_2(a+b)}$$

$$(3)$$

$$X_1 = \frac{m}{P_1} \quad \text{when } 0 < \frac{P_1}{P_2} < \frac{1}{2}$$

Any value of X_1 which satisfies $\frac{m}{3P_1} \leq X_1 \leq \frac{m}{P_1}$ when $\frac{P_1}{P_2} = \frac{1}{2}$

$$X_1 = \frac{m}{P_1+P_2} \quad \text{when } \frac{1}{2} < \frac{P_1}{P_2} < 2$$

Any value of X_1 which satisfies $0 \leq X_1 \leq \frac{2m}{3P_1}$ when $\frac{P_1}{P_2} = 2$

$$X_1 = 0 \quad \text{when } \frac{P_1}{P_2} > 2$$

$$X_2 = 0 \quad \text{when } 0 < \frac{P_1}{P_2} < \frac{1}{2}$$

Any value of X_2 which satisfies $X_2 = \frac{m}{2P_1} - \frac{1}{2}X_1 \quad \forall \frac{m}{3P_1} \leq X_1 \leq \frac{m}{P_1}$ when $\frac{P_1}{P_2} = \frac{1}{2}$

$$X_2 = \frac{m}{P_1+P_2} \quad \text{when } \frac{1}{2} < \frac{P_1}{P_2} < 2$$

Any value of X_2 which satisfies $X_2 = \frac{2m}{P_1} - 2X_1 \quad \forall 0 \leq X_1 \leq \frac{2m}{3P_1}$ when $\frac{P_1}{P_2} = 2$

$$X_2 = \frac{m}{P_2} \quad \text{when } \frac{P_1}{P_2} > 2$$

8.

(1)

(2)

$$X_1 = \frac{m}{2} \quad \text{when } 0 \leq m \leq 8$$

$$X_1 = m - 4 \quad \text{when } 8 < m \leq 20$$

$$X_1 = \frac{m+12}{2} \quad \text{when } m > 20$$

$$\begin{aligned} X_2 &= \frac{m}{8} \quad \text{when } 0 \leq m \leq 8 \\ X_2 &= \frac{m-4}{4} \quad \text{when } 8 < m \leq 20 \\ X_2 &= \frac{m+12}{8} \quad \text{when } m > 20 \end{aligned}$$

$$\begin{aligned} X_3 &= \frac{m}{2} \quad \text{when } 0 \leq m \leq 8 \\ X_3 &= 4 \quad \text{when } 8 < m \leq 20 \\ X_3 &= \frac{m+12}{8} \quad \text{when } m > 20 \end{aligned}$$