

HT 2023

#1 a)

$P_0$                        $P_X$                        $P_\square$   
 $O$                        $X$                        $\square$

A

|           |                              |                              |                              |
|-----------|------------------------------|------------------------------|------------------------------|
| $O$       | $0, 0$                       | <u><math>1</math></u> , $-1$ | $-1$ , <u><math>1</math></u> |
| $X$       | $-1$ , <u><math>1</math></u> | $0, 0$                       | <u><math>1</math></u> , $-1$ |
| $\square$ | <u><math>1</math></u> , $-1$ | $-1$ , <u><math>1</math></u> | $0, 0$                       |

b) in keiner Zelle sind beide Zahlen unterstrichen

$\Rightarrow$  kein NGG in reinen Strategien.

$$\begin{aligned}
 c) \quad U_A(O, P) &= 0 \cdot P_0 + 1 P_X - 1 P_\square = P_X - P_\square \\
 U_A(X, P) &= -P_0 + P_\square \\
 U_A(\square, P) &= P_0 - P_X
 \end{aligned}
 \left. \vphantom{\begin{aligned} U_A(O, P) \\ U_A(X, P) \\ U_A(\square, P) \end{aligned}} \right\} =$$

$$-P_0 + P_\square = P_0 - P_X$$

$$P_X - P_\square = -P_0 + P_\square$$

$$\begin{aligned}
 p_X - p_B &= -p_O + p_B & \Leftrightarrow & p_X = 2p_B - p_O & \leftarrow & \Rightarrow p_X = 2p_B - p_B = p_B \\
 -p_O + p_B &= p_O - p_X & \Rightarrow & -p_O + p_B = p_O - 2p_B + p_O & \\
 & & \Leftrightarrow & 3p_B = 3p_O & \Leftrightarrow & p_B = p_O
 \end{aligned}$$

$$p_O + p_X + p_B = 1$$

$$p_O = p_X = p_B \Rightarrow p_O = p_X = p_B = \frac{1}{3}$$

Verifikation:

$$U_A(O, p) = p_X - p_B = \frac{1}{3} - \frac{1}{3} = 0$$

$$U_A(X, p) = -p_O + p_B = -\frac{1}{3} + \frac{1}{3} = 0$$

$$U_A(B, p) = p_O - p_X = \frac{1}{3} - \frac{1}{3} = 0 \quad \text{das einzige!}$$

$\Rightarrow \left( \left( \frac{1}{3}, \frac{1}{3}, \frac{1}{3} \right), \left( \frac{1}{3}, \frac{1}{3}, \frac{1}{3} \right) \right)$  ist ein  $NEB$  in gemischten Strategien

d)

|   | $P_0$<br>0    | $P_X$<br>X    | $P_D$<br>□    | $P_U$<br>U    |
|---|---------------|---------------|---------------|---------------|
| 0 | 0, 0          | <u>1</u> , -1 | -1, <u>1</u>  | -1, <u>1</u>  |
| X | -1, <u>1</u>  | 0, 0          | <u>1</u> , -1 | -1, <u>1</u>  |
| □ | <u>1</u> , -1 | -1, <u>1</u>  | 0, 0          | <u>1</u> , -1 |
| U | <u>1</u> , -1 | <u>1</u> , -1 | -1, <u>1</u>  | 0, 0          |

Im neuen  
NGG wird  
0 durch U  
ersetzt

$$\begin{aligned}
 U_A(0, P) &= P_X - P_D - P_U \\
 U_A(U, P) &= P_0 + P_X - P_D
 \end{aligned}
 \left. \vphantom{\begin{aligned} U_A(0, P) &= P_X - P_D - P_U \\ U_A(U, P) &= P_0 + P_X - P_D \end{aligned}} \right\}
 \begin{aligned}
 &U \text{ dominiert } 0 \text{ schwach, da} \\
 &U_A(U, P) - U_A(0, P) = P_0 + P_U \geq 0
 \end{aligned}$$