Q. use the graphical method to solve the following

|     | $B_1$ | $B_2$ | $B_3$ | $B_4$ |
|-----|-------|-------|-------|-------|
| $A_1$ | 2 | 2 | 3 | -2 |
| $A_2$ | 4 | 3 | 2 | 6 |

Case 1. $2 \times m \rightarrow$ lower boundary के सबसे नजदीक का point

Case 2. $m \times 2 \rightarrow$ ऊपर से 2 highest point

|        |     | $B_1$ | $B_2$ | $B_3$ | $B_4$ |
|--------|-----|-------|-------|-------|-------|
| (P)    | $A_1$ | 2 | 2 | 3 | -2 |
| (1-P)  | $A_2$ | 4 | 3 | 2 | 6 |

B's strategies        A's expected pay off.

$B_1$     $A_1 + A_2$     $2P + 4(1-P)$

$B_2$                  $2P + 3(1-P)$

$B_3$                  $3P + 2(1-P)$

$B_4$                  $-2P + 6(1-P)$

Graphical method कोई method नही है बल्कि question में principle of dominance से हम question के रूप को छोटा कर matrix को $2 \times 2$ के रूप में लाते थे पर इसमें ये काम हम graph से करते हैं।
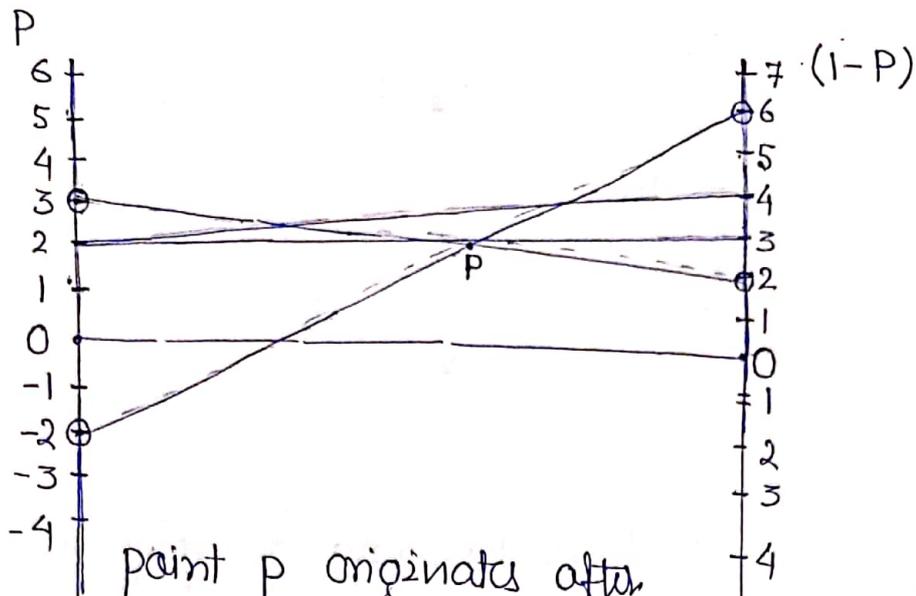
point p originates after
cutting $3P + 2(1-P)$ and $-2P + 6(1-P)$

|  | $(q)$ | $(1-q)$ |
|---|---|---|
| $A_1$ (P) | 3 | -2 |
| $A_2$ (1-P) | 2 | 6 |
|  | $B_1$ | $B_2$ |

**B' strategies** $= A_1 + A_2$

$B_1 = 3P + 2(1-P)$ ——— 1

$B_2 = -2P + 6(1-P)$ ——— 2

Eq 1 = 2 of equating
$B_1 = B_2$.

$3P + 2(1-P) = -2P + 6(1-P)$

$5P + 2(1-P) = 6(1-P)$

$5P = 6(1-P) - 2(1-P)$

$5P = 4(1-P)$

$5P = 4 - 4P$

$9P = 4$      $P = 4/9$.      $(1-P) = \dfrac{5}{9}$

**A's strategies:** =

$= A_1 = 3q + -2(1-q) \,\&\, A_2 = 2q + 6(1-q)$

$= 3q - 2(1-q) \,\&\, 2q + 6(1-q)$

equating $A_1 = A_2$.      $= 3q - 2 + 2q = 2q + 6(1-q)$

$$5q - 2 = 2q + 6 - 6q$$
$$5q - 2 = 6 - 4q$$
$$9q = 8$$
$$q = 8/9 \quad \text{and} \quad 1 - q = 1/9$$

Value of game —

$$B_1 = 3P + 2(1 - P)$$
$$= 3 \times 4/9 + 2 \times \frac{5}{9}$$
$$= \frac{12 + 10}{9} = \frac{22}{9}$$

$$B_2 = -2P + 6(1 - P)$$
$$= -2 \times \frac{4}{9} + 6 \times \frac{5}{9}$$
$$= \frac{-8}{9} + \frac{30}{9}$$
$$= \frac{22}{9}$$

$$A_1 = 3q - 2(1 - q)$$
$$= 3 \times \frac{8}{9} - 2 \times \frac{1}{9}$$
$$= \frac{24 - 2}{9} = \frac{22}{9}$$

$$A_2 = 2q + 6(1 - q)$$
$$= 2 \times \frac{8}{9} + 6 \times \frac{1}{9}$$
$$= \frac{16 + 6}{9} = \frac{22}{9}$$

Value of game $= \dfrac{22}{9}$

A's Strategy $= 4/9 \ \& \ 5/9$

B's Strategy $= 8/9 \ \& \ 1/9$.

Ques— Obtain the optimal strategies for both the person & the value of the game for 2 person zero sum game

|   | $B_1$ | $B_2$ |
|---|---|---|
| $A_1$ | 1 | $-3$ |
| $A_2$ | 3 | 5 |
| $A_3$ | $-1$ | 6 |
| $A_4$ | 4 | 1 |
| $A_5$ | 2 | 2 |
| $A_6$ | $-5$ | 0 |

Case 2. $m \times 2$
r        c

**Solution**

|   | $B_1$ $(q)$ | $B_2$ $(1-q)$ |
|---|---|---|
| $A_1$ | 1 | $-3$ |
| $A_2$ | 3 | 5 |
| $A_3$ | $-1$ | 6 |
| $A_4$ | 4 | 1 |
| $A_5$ | 2 | 2 |
| $A_6$ | $-5$ | 0 |

| here A' strategies | | B'ß expected pay off |
|---|---|---|
| $A_1$ | — | $q + -3(1-q)$. |
| $A_2$ | — | $3q + 5(1-q)$ |
| $A_3$ | — | $-1q + 6(1-q)$ |
| $A_4$ | — | $4q + 1(1-q)$ |
| $A_5$ | — | $2q + 2(1-q)$ |
| $A_6$ | — | $-5q + 0(1-q)$. |

$q$
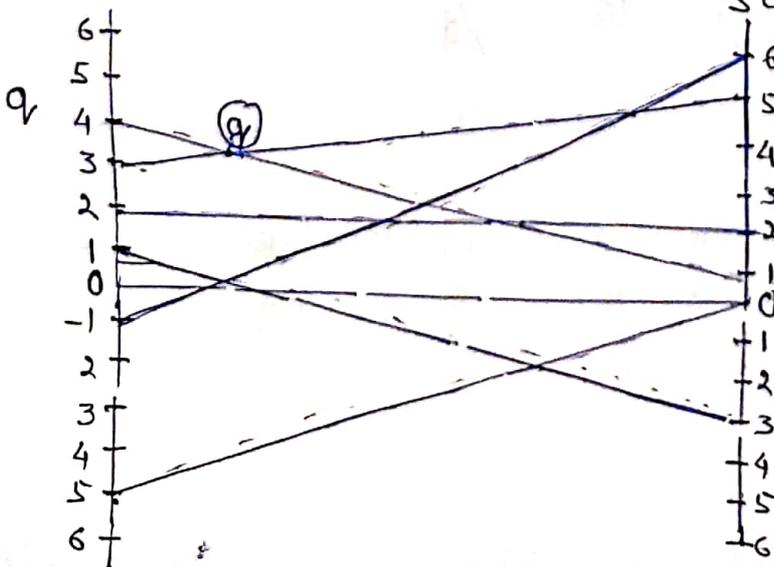
$1-q$ (माप से 2nd highest)

$$5q - 2 = 2q + 6 - 6q$$
$$5q - 2 = 6 - 4q$$
$$9q = 8$$
$$q = 8/9 \quad \text{and} \quad 1 - q = 1/9$$

value of game—

$$B_1 = 3P + 2(1 - P)$$
$$= 3 \times 4/9 + 2 \times \frac{5}{9}$$
$$= \frac{12 + 10}{9} = \frac{22}{9}$$

$$B_2 = -2P + 6(1 - P)$$
$$= -2 \times \frac{4}{9} + 6 \times \frac{5}{9}$$
$$= \frac{-8}{9} + \frac{30}{9}$$
$$= \frac{22}{9}$$

$$A_1 = 3q - 2(1 - q)$$
$$= 3 \times \frac{8}{9} - 2 \times \frac{1}{9}$$
$$= \frac{24 - 2}{9} = \frac{22}{9}$$

$$A_2 = 2q + 6(1 - q)$$
$$= 2 \times \frac{8}{9} + 6 \times \frac{1}{9}$$
$$= \frac{16 + 6}{9} = \frac{22}{9}$$

Value of game $= \frac{22}{9}$

A's strategy $= 4/9$ & $5/9$

B's strategy $= 8/9$ & $1/9$.

Ques— Obtain the optimal strategies for both the person & the value of the game for 2 person zero sum game