23- S1-Q5

	S_1	S_2	S_3
C_1	50	-110	130
C_2	170	-70	100
C_3	-60	50	-20

Q: (a) pessimism

Solution

Max min $-110 < -70 < -60$

So choose C_3

(b) optimism

Solution

max max $170 > 130 > 50$

So choose C_2

(c) regret

Solution

	S_1	S_2	S_3
C_1	50	-110	130
C_2	170	-70	100
C_3	-60	50	-20
Max	170	50	130

	S_1	S_2	S_3	$\max\{r_{ij}\}$
C_1	120	160	0	160
C_2	0	120	30	(120) min
C_3	230	80	150	230

$r_{i1} = |170 - g_{i1}|$

$r_{i2} = |50 - g_{i2}|$

$r_{i3} = |130 - g_{i3}|$

So choose C_2

$170+60 = 230$

$50+110 \quad 50+70$

$130-50$

$130+20$

(d) Hurwicz

Solution

$C_{OPT} = P$

	S_1	S_2	S_3
C_1	50	(-110)	(130)
C_2	(170)	(-70)	100
C_3	(-60)	(50)	-20

$H_1 = p\,130 + (1-p)\times(-110) = 240p - 110$

$H_2 = p\,170 + (1-p)\times(-70) = 240p - 70$

$H_3 = p\,50 + (1-p) - 60 = 110p - 60$

$130p - 110 + 110p = 240p - 110$

$170p - 70 + 70p = 240p - 70$

$50p - 60 + 60p = 110p - 60$

we will choose the max H

due to $240p - 70 > 240p - 110$, so we prefer to choose $H_2 > H_1$

So compare H_2 and H_3

let $H_2 > H_3$ $\quad 240p - 70 > 110p - 60$, subject to $0 \le p \le 1$

$130p > 10$ $\quad p > \frac{1}{13} = 0.07692$

Summary,

choose $\begin{cases} C_2 & \frac{1}{13} < p \le 1 \\ \text{indifference of } C_2 \text{ and } C_3 & p = \frac{1}{13} \\ C_3 & 0 \le p < \frac{1}{13} \end{cases}$