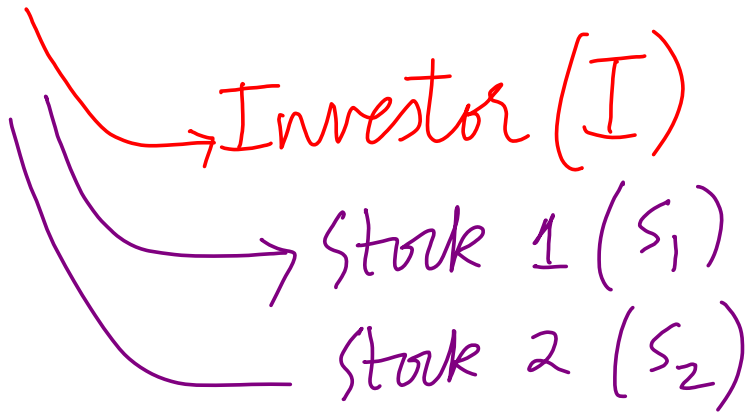
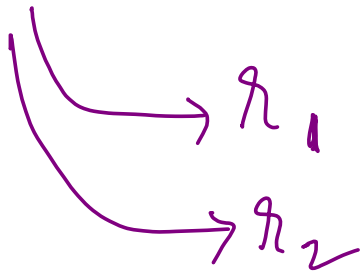
Portfolio Management Game

Investment Game:



past returns of stocks.



No intersection of BR in pure strategies

Investor \ Nature / market	R_1	R_2
S_1	5, -5	6, -6
S_2	10, -10	3, -3

$\Rightarrow$ No pure strategy NE.

		q	$1-q$
	Investor \ Market	R_1	R_2
p	S_1	5, -5	6, -6
$1-p$	S_2	10, -10	3, -3

$$U_M(R_1) = -5p + (-10)(1-p)$$
$$= 5p - 10$$

$$U_M(R_2) = -6p + (-3)(1-p)$$
$$= -3p - 3$$

$$5p - 10 = -3p - 3$$

$$\Rightarrow 8p = 7$$

$$\boxed{p = \frac{7}{8}}$$

$$1 - p = \frac{1}{8}$$

Mixed strategy of investor $= \left(\frac{7}{8}, \frac{1}{8}\right)$

implies invests $\frac{7}{8}$ funds in stock 1 and $\frac{1}{8}$ funds in stock 2.

$$U_I(S_1) = 5q + 6(1-q)$$
$$= 6 - q$$

$$U_I(S_2) = 10q + 3(1-q)$$
$$= 7q + 3$$

$$6 - q = 7q + 3$$
$$\Rightarrow 8q = 3$$
$$\Rightarrow \boxed{\begin{aligned} q &= 3/8 \\ 1-q &= 5/8 \end{aligned}}$$

Therefore, mixed strategy employed by market

$$= \left(\frac{3}{8}, \frac{5}{8}\right)$$

Mixed strategy NE of this investment or portfolio management game is,

$$\left(\left(\frac{7}{8}, \frac{1}{8}\right), \left(\frac{3}{8}, \frac{5}{8}\right)\right)$$

Investor Market