9/19/08

GAME THEORY

Two players A & B

$$
\begin{array}{c|ccc}
 & C1 & C2 & C3 \\
\hline
R1 & 3 & -1 & 2 \\
R2 & 4 & -2 & -3 \\
R3 & -2 & 4 & 2
\end{array}
\quad = P
$$

$P_A = -1$
$P_B = 2$

A choose one of R_1, R_2, R_3 : R_i

B chooses one of C_1, C_2, C_3 : C_j

R_i & C_j are exposed simultaneously

B pays P_{ij} to A.

Example of a zero-sum two person game.

$$\begin{bmatrix} 1 & 3 & 2 \\ -2 & -3 & 3 \\ -3 & -4 & -10 \end{bmatrix} \qquad P_A = P_B = \underline{1}$$

Rowplayer can guarantee to win at least

$$P_A = \max_i \min_j A_{ij}$$

Column player can guarantee to lose no more than

$$P_B = \min_j \max_i A_{ij}$$

In general

$$P_A \leq P_B$$

$$\begin{array}{cc} & v \\ u & \left[\ \text{PAY}(u,v) \ \right] \end{array}$$

long run average

$$u = (u_1, u_2, \ldots, u_n \;;\; u_n(v_1, v_2, \ldots, v_{n-1})$$

nth play

(u^*, v^*) is STABLE

if

$$PAY(u, v^*) \leq PAY(u^*, v^*) \leq PAY(u^*, v)$$

?? Is there always a stable solution ??