Group II - Game Theory
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1. Consider a noncooperative n-person game.

   (a) Define Pure Strategic Equilibrium (PSE).

   (b) Define Nash (Strategic) Equilibrium or explain (shortly) how it differs from a PSE.

   (c) Find all PSE's of the following noncooperative 2-person game,

$$\begin{pmatrix} (-3,-4) & (2,-1) & (0,6) & (1,1) \\ (2,0) & (2,2) & (-3,0) & (1,-2) \\ (2,-3) & (-5,1) & (-1,-1) & (1,-3) \\ (-4,3) & (2,-5) & (1,2) & (-3,1) \end{pmatrix}$$

2. Consider the cooperative TU bimatrix game:

$$\begin{bmatrix} (0,0) & (6,2) & (-1,2) \\ (4,-1) & (3,6) & (5,5) \end{bmatrix}.$$

   (a) Find the TU-values.

   (b) Find the associated side payment.

   (c) Find the optimal threat strategies.

3. Consider the three-person game in coalitional form with characteristic function,

$$\begin{array}{lccc} & \bar{v}(\{1\}) = 0 & \bar{v}(\{1,2\}) = 2 & \\ \bar{v}(\emptyset) = 0 & \bar{v}(\{2\}) = 1 & \bar{v}(\{1,3\}) = 3 & \bar{v}(\{1,2,3\}) = 10 \\ & \bar{v}(\{3\}) = 2 & \bar{v}(\{2,3\}) = 6 & \end{array}$$

   How would you find the least rational core? (establish the linear program)