

Math 486: Game Theory

Assignment 11

Due Thur April 11

Consider the bimatrix game given by the payoff matrix

$$M = \begin{pmatrix} (-1, -1) & (1, 3) & (3, 0) \\ (1, 0) & (0, 1) & (0, 3) \end{pmatrix}.$$

1. Sketch the feasible payoff region  $X$  if the players can sign binding contracts specifying coordinated strategies and free disposal.
2. Indicate the Pareto-optimal points of  $X$  and  $Y$ .
3. Indicate the bargaining sets of  $X$  if the disagreement point is  $d = (0, 1)$ .
4. Indicate the bargaining sets of  $X$  if the disagreement point is  $e = (1, -1)$ .
5. *Read the example on page 125 of the notes before trying this problem.*
  - (a) Find the Nash bargaining solution for the bargaining problem  $(X, d)$  with bargaining powers  $\alpha = \frac{7}{8}$  and  $\beta = \frac{1}{8}$ .
  - (b) Find the Nash bargaining solution for the bargaining problem  $(X, d)$  with bargaining powers  $\alpha = \frac{1}{3}$  and  $\beta = \frac{2}{3}$ .
  - (c) Find the Nash bargaining solution for the bargaining problem  $(X, e)$  with bargaining powers  $\alpha = \frac{7}{8}$  and  $\beta = \frac{1}{8}$ .
  - (d) Find the Nash bargaining solution for the bargaining problem  $(X, e)$  with bargaining powers  $\alpha = \frac{1}{3}$  and  $\beta = \frac{2}{3}$ .
6. For each of 5(a)-(d) above, write a contract that yields the Nash bargaining solution payoff.