

Quiz #3. Nash Arbitration
 EPA 2142: Policy and Decision Models
 8 December 2009

Rose and Colin are playing the following game.

		Colin	
		A	B
Rose	A	(4,2)	(3,9)
	B	(5,3)	(2,1)

There are multiple Nash equilibria in this game, as shown below.

	Payoff to Rose	Payoff to Colin
Pure Strategy Equilibria 1	3	9
Pure Strategy Equilibria 2	5	3
Mixed Strategy Equilibria	7/2	25/9
Worst Outcome for Player	3	25/9

We observe for instance, that pure strategy equilibria 1 results in the worst payoff for Rose. The mixed strategy equilibria results in the worst payoff (25/9) for Colin. These values are recorded as the row “worst outcome for player.”

Answer the following questions concerning the game.

- a. Plot the payoff polygon of the game. Include the mixed strategy equilibrium. Assume that the security levels of both players are (2 point).
- b. A policy analyst observes the game and the outcome of play, and believes there is a role for arbitration. Why does the analyst think so, given each of the three equilibria (1 point)?
- c. Mathematically characterize the negotiation set, showing both the equation and the domain in which the negotiation set is still valid. Set the status quo to the values [3, 25/9] (2 point).
- d. Compute the Nash arbitration solution for this game. As above assume that the security levels of both players are set to the values [3, 25/9] (2 points).
- e. In your opinion is the Nash arbitration scheme fair to both players? Why do you say so (1 point)?
- f. Is the worst outcome for the player across all the equilibria the same as the security level of the player (2 point)?