Activity: Strategic Games and Dominance Econ 305

Brandon Lehr

1 Strategic Games

For each of the games described below, determine the normal form of the game: number of players n, strategy space for each player S_i , and payoffs (as a matrix or function).

a. Matching Pennies (a zero-sum game). Two players simultaneously place a penny on a table. If the pennies match (e.g., both placed heads up), player 2 pays player 1 a dollar. If the pennies do not match, player 1 pays player 2 a dollar.

Players:
$$N = \{ 1/2 \}$$

Strates, Space, $S_1 = \{ 1/2 \}$
Payoff Functions: $V_1 = \{ 1/2 \}$
 $V_2 = \{ 1/2 \}$
 $V_2 = \{ 1/2 \}$
 $V_3 = \{ 1/2 \}$
 $V_4 = \{ 1/2 \}$
 $V_4 = \{ 1/2 \}$
 $V_5 = \{ 1/2 \}$
 $V_6 = \{ 1/2 \}$
 $V_7 = \{ 1/2 \}$

b. Bach or Stravinsky / Battle of the Sexes (a coordination game with some conflict). A couple wants to be together on their date night rather than alone, but they have different preferences over which type of concert they attend. They simultaneously — and without communication — choose to go to either the Bach or Stravinsky concert. Conditional on being together, player 1 prefers Bach and player 2 prefers Stravinsky.

Players:
$$N = \frac{5}{2}1,2$$
 }
Stratesy Sets: $S_1 = \frac{5}{8}B,S$ }

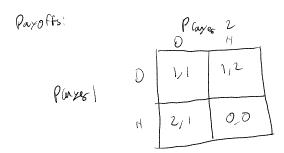
Player $S_2 = \frac{5}{8}B,S$ }

Player $S_3 = \frac{5}{8}B,S$ }

Player $S_4 = \frac{5}{8}B,S$ }

Player $S_4 = \frac{5}{8}B,S$ }

c. Hawk vs. Dove / Chicken (an anti-coordination game). Two teenagers ride their bikes at high speed towards each other along a narrow ride. Neither of them wants to "chicken out" and lose their pride, but even worse is getting hurt by crashing into the oncoming biker.



d. Cournot Competition (an industrial organization game). Two firms compete by simultaneously choosing how much to produce of a homogenous good (e.g., oil, soybeans) for a market.

Players:
$$r^{22}$$

Strategy Space: $S_i = [0, \infty)$
Payoff: $[t_i = d^{-1}(b_i + b_2) a_i - C_i(a_i)]$

2 Strict Dominance

Are the following games dominance solvable? Justify your answers.

a. A 4×4 game:



	W	X	X	X
A	5,2	2,6	1,4	0,4
В	0,0	(3,2)	2,1	1,2
C	7,0	2.2	1,5	5,4
Þ	9/5	₩ 3	0,/2	4,8

b. The beauty contest game, i.e., to win, come closest to guessing two-thirds the average of numbers between 0 and 100 selected by players.

Ye every strategy is strictly dominated to 0 the same is doringene sulvable