Nathan Pish Midterm 3 Section 1 Solutions December 6, 2007

1.						
1	2	3	4	1	2	6
6	3	4	5	4	6	5
5	5	6	5	5	7	6
0	0	1	1	4	2	0
1	1	4	3	2	4	0
4	1	2	1	3	6	0

Value of game = 5An optimal strategy for Row Player is: (0,0,1,0,0,0)An optimal strategy for Column Player is: (0,1,0,0,0,0,0)

2.							
	1	2	3	1	2	4	5
	3	1	4	4	2	5	4
	3	3	2	5	2	3	1
	5	1	4	5	2	3	2
	4	1	2	4	2	1	3

Value of game = 2An optimal strategy for Row Player is:  $(\frac{2}{3}, 0, \frac{1}{6}, \frac{1}{6}, 0)$ An optimal strategy for Column Player is: (0,0,0,0,1,0,0)

3.				
2	0	2	-2	
2	-2	0	5	
4	2	5	0	

Value of game =  $\frac{10}{9}$ An optimal strategy for Row Player is:  $(0, \frac{2}{9}, \frac{7}{9})$ An optimal strategy for Column Player is:  $(0, \frac{5}{9}, 0, \frac{4}{9})$ 

4. Find the least-squares solutions |x, y| for the system

$$\begin{aligned} x + 2y &= 3\\ 4x + 5y &= 6\\ 7x + 8y &= 8\\ 10x + 11y &= 12\\ \begin{bmatrix} 1 & 4 & 7 & 10\\ 2 & 5 & 8 & 11 \end{bmatrix} \begin{bmatrix} 1 & 2\\ 4 & 5\\ 7 & 8\\ 10 & 11 \end{bmatrix} \begin{bmatrix} x\\ y \end{bmatrix} = \begin{bmatrix} 1 & 4 & 7 & 10\\ 2 & 5 & 8 & 11 \end{bmatrix} \begin{bmatrix} 3\\ 6\\ 9\\ 12 \end{bmatrix} \Rightarrow \frac{166x + 188b = 210}{188x + 214y = 240} \Rightarrow \frac{x = -1}{y = 2} \Rightarrow |-1,2| \end{aligned}$$

5. Find the mean, the midrange, and the central value for the following numbers: 0,-1,3,4,5,-1,7,8,9,10,0,-1 We can order this set from least to greatest: -1, -1, -1, 0, 0, 3, 4, 5, 7, 8, 9, 10 Mean =  $\frac{43}{12}$  = 3.583 Midrange = 4.5Central Value = 3.5