

**Corrections and updates for fifth printing of  
Osborne's "An Introduction to Game Theory"  
(Oxford University Press, 2004)**

2023.3.12

I thank the following people for pointing out errors and improvements: Kyung Hwan Baik, Randall Calvert, Debarshi Das, David Epstein, Cihan Ercan, Xiaohua Fang, Satoshi Fukuda, Farhad Husseinov, Marek Hudik, Haruo Imai, Geoffrey A. Jehle, Molly Jung, Davit Khantadze, Yuxiao Liang, John Manchak, Peter J. McCabe, Scott Moser, Theo J. S. Offerman, David Ong, Scott Moser, Carolyn Pitchik, Mahendra Ramanna Prasad, Deepak Kumar Rangi, Svetoslav Salkin, Bill Sandholm, Arthur J. H. C. Schram, Xiquan Shi, Lucas Threinen, Xiaoyu Wang, Asher Wolinsky, Andrew Yates, Yong J. Yoon, Buyi Zhu.

**Corrections**

*Page, Line Correction*

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| 30     | Two lines above Exercise 30.1, replace "pursing" with "pursuing".   |
| 50     | Replace the last sentence of the second bullet point of item <i>a</i> , on lines 15–16, with "Thus player <i>i</i> is at least as well off naming $x_i^*$ as she is naming $x_i$ ."   |
| 56     | On the line below (56.2), replace " $c \geq 0$ " with " $c > 0$ ".  |
| 59, –3 | Replace " $c \geq 0$ " with " $c > 0$ ".  |
| 62, –9 | Replace "firm's" with "firms".  |
| 63     | Replace the last two sentences of Exercise 63.1 with "Find the Nash equilibria of the game. Find an action profile $(x_1, \dots, x_n)$ at which each firm's output is higher than it is at any Nash equilibrium."   |
| 67     | In the third line of Exercise 67.1, insert "continuous" between "any" and "function".   |
| 69     | In part <i>a</i> of Exercise 68.2, replace the first sentence with "Suppose that when the firms' prices are the same, each firm obtains a positive fraction of the demand when the common price is less than $c_2$ , but firm 1 obtains all the demand when the common price is $c_2$ or more." |

- 75 Exercise 75.2 should specify the players' payoffs when no citizen stands as a candidate and when several candidates tie for first place. Replace the fifth through eighth sentences with: "Winning confers the benefit  $b$ , and citizens care about the position of the winning candidate. Specifically, the payoff of a citizen with favorite position  $x$  who becomes a candidate is the expected value of  $-|x - x_i^*| + b/k - c$  (as  $x_i^*$  ranges over the positions of the winning candidates) if she ties with  $k - 1$  other candidates for first place, and the expected value of  $-|x - x_i^*| - c$  if she is not one of the candidates tied for first place. (For any number  $z$ ,  $|z|$  denotes the absolute value of  $z$ :  $|z| = z$  if  $z > 0$  and  $|z| = -z$  if  $z < 0$ .) The payoff of a citizen with favorite position  $x$  who does not become a candidate is the expected value of  $-|x - x_i^*|$  if some citizen becomes a candidate, and  $K$ , with  $K < b - c$ , if no citizen becomes a candidate." The exercise should also include the assumption that less than one-third of the citizens' favorite positions are equal to the median favorite position.
- 76, 10–11 Replace "one prefers  $x$  to  $z$  and the other prefers  $z$  to  $x$ " with "both prefer  $z$  to  $x$ ".
- 86 In Exercise 86.1, change the word "action" on lines 1, 2, 4, and 6 to "policy" (to avoid confusion with the actions in the strategic game).
- 91 Delete the parenthetical claim on the last line of Exercise 91.1 (which is not correct). (Probably in each case the pair of actions given is the unique equilibrium in which neither player's action is weakly dominated.)
- 110 Replace "left" with "right" on the second line of Exercise 110.1.
- 115, 1 Replace "a swimmer" with "any swimmer".
- 118 In line 2 of Exercise 118.2, replace " $k \leq m$ " with " $2 \leq k \leq m$ ".
- 136, 1 Add "by" after "generated".
- 148 Line 7 of Section 4.12.2 is confusing. Replace it with " $v$  defined by  $v(x) = \sqrt{u(x)}$  for all  $x$ , for which  $v(0) = 0$ ,  $v(1) = 1$ , and  $v(5) = 2$ , is not consistent with such a".
- 150 In each of the games in Exercise 150.1, replace the actions  $C$  and  $D$  with  $Q$  and  $F$ .
- 185 The continuity assumption in Exercise 185.2*b* is not stated correctly. Replace it with "Assume also that the players' preferences are continuous: if a player prefers  $P$  to its complement (the remainder of the cake), then there is a subset  $P'$  of  $P$  not equal to  $P$  such that the player prefers  $P'$  to its complement."
- 195, 10–11 Delete the clause "so it needs to pay each legislator more than  $V_Y/\mu$ ", which is not correct and not needed.

- 197 At the start of the penultimate line of the item *Terminal histories*, replace  $y^1 + \dots + y^T < k_2$  with  $y^1 + \dots + y^{T-1} < k_2$ .
- 209 In Figure 209.2 the pair of payoffs to the action pair  $(B, R)$  should be  $(2, 1)$  (not  $(2, 0)$ ).
- 215, –12 Insert “the negative of” before “the average distance”.
- 215, –11 Replace the first “of” with “to”.
- 228 Change the penultimate sentence of Exercise 228.1 to “Specify each game precisely and find the outcomes of subgame perfect equilibria in which no player’s vote in either period is weakly dominated.”
- 241 Modify the definition of a coalitional game with transferable payoff: A coalitional game has **transferable payoff** if there is a collection of payoff functions, one representing each player’s preferences, and, for each coalition  $S$ , a number  $v(S)$ , such that for every action of  $S$  the sum of the payoffs of the members of  $S$  is  $v(S)$  and for every  $S$ -allocation  $x_S$  of  $v(S)$ ,  $S$  has an action that yields  $x_S$ .
- 254–255 The argument in the last paragraph of page 254 and the last two points in (255.1) are not correct. An owner sells her horse if and only if her index is at most  $k^*$  and a nonowner buys a horse if and only if her index is at most  $k^*$ . (A player whose valuation is  $p^*$  trades only if her index is at most  $k^*$ .) The last paragraph on page 254 should be replaced by the following paragraph.  
 Finally, I argue that the set of owners who sell their horses is  $\{1, \dots, k^*\}$  and the set of nonowners who buy a horse is  $\{1, \dots, k^*\}$ . If  $\max\{\sigma_{k^*}, \beta_{k^*+1}\} < p^* < \min\{\beta_{k^*}, \sigma_{k^*+1}\}$ , this result follows immediately from the paragraph before Exercise 254.1. If  $p^* = \max\{\sigma_{k^*}, \beta_{k^*+1}\}$  or  $p^* = \min\{\beta_{k^*}, \sigma_{k^*+1}\}$  then it follows from that paragraph combined with the fact that every trade involves both an owner and a nonowner. (For example, if  $p^* = \sigma_{k^*} > \beta_{k^*+1}$ , then  $\beta_{k^*} > p^*$ , so that the set of nonowners who buy a horse is  $\{1, \dots, k^*\}$ , and  $\sigma_{k^*-1} < p^* < \sigma_{k^*+1}$ , so that owners with index at most  $k^* - 1$  sell their horses and owners with index at least  $k^* + 1$  do not sell their horses. Consequently owner  $k^*$  must sell her horse.)  
 The last two points in (255.1) should be replaced by the following point.  
 every owner with index at most  $k^*$  sells her horse, and every other owner retains her horse; every nonowner with index at most  $k^*$  buys a horse, and no other nonowner buys a horse.  
 The word “four” should be deleted on the last line of page 255.
- 288, 8 Replace second occurrence of  $q_2(P(q_1 + q_2) - c_L)$  with  $q_2(P(q_1 + q_2) - c_H)$ .

- 288 In lines 3, 11, and 13 of Exercise 288.1, replace  $\ell$  and  $h$  with  $L$  and  $H$ .
- 296 Replace “the highest of the other players’ bids” on line 5 with “the highest of the other players’ valuations”.
- 320–321 Replace  $0 \leq \varepsilon < \frac{1}{4}$  by  $0 < \varepsilon < \frac{1}{4}$  on the bottom line of the page, on the seventh line from the bottom, and on the last line of the caption of Figure 321.1.
- 336 In Figure 336.1, the payoff of the parent after the history (*Not hungry, Squawk, Keep*) should be  $1 + rV(1 - t)$ , not  $1 + rV$ .
- 347 In the third display, replace the second  $b$  with  $4b$ .
- 348 The point 1 on the horizontal axis should be 15mm further to the right.
- 350, –9 Interchange “receiver” and “sender”.
- 353 Replace the first occurrence of  $y_0 + 4b$  with  $y_0 + 3b$  in the fourth line of the display.
- 381, –10 Replace  $X_i^{t-1}$  with  $X_j^{t-1}$ .
- 388 On the third line of Exercise 388.1c replace  $w_3$  with  $w_3/2$ .
- 406, 9 Change  $\gamma > 0$  to  $0 < \gamma < 1$ .
- 411 In the displayed statement, replace “if  $u(a^*, a^*) > u(b, b)$  for every action  $b$ ” with “if  $u(a^*, a^*) > u(b, b)$  for every action  $b \neq a^*$ ”.
- 423, –1 Replace “history” with “terminal history”.
- 424, –11 Replace “history” with “nonterminal history”.
- 424, –7 Replace “history” with “nonterminal history”.
- 429 Replace  $t + k + 1$  with  $t + k$  two lines above the penultimate display and one line above the last display.
- 438, 6 Replace “player’s” with “players’”.
- 439 In Exercise 439.1, add the assumption that the number of periods is at least 3, and in part (b) change the condition on  $\epsilon$  to  $2 < \epsilon < 4$ .
- 444, 8 Replace the phrase “in a subgame following a history” with “in the whole game and in a subgame following a history”.
- 447 Move the phrase “where  $j$  is the other player” from the line below the display to the end of the following (parenthetical) sentence, and replace  $b^t$  near the end of the line below the display with  $b_i^t$ .
- 448, –8 Delete the first (or the second) “more”.
- 452, –5 Replace “with probability  $\frac{1}{2}$ ” with “with the same probability”.
- 469, –12 Change  $\delta_1^2 x_2$  to  $\delta_2^2 x_2$ .

- 487 The sentence starting after the sentence containing the first display should be “Then the maximizer of  $(v'_1 - d'_1)(v'_2 - d'_2)$  over  $U'$  is  $(\alpha_1 v_1^* + \beta_1, \alpha_2 v_2^* + \beta_2)$ , where  $(v_1^*, v_2^*)$  is the maximizer of  $(\alpha_1 v_1 + \beta_1 - d'_1)(\alpha_2 v_2 + \beta_2 - d'_2)$  over  $U$ .” In the following display, the second occurrence of  $d'_1$  should be  $d'_2$  and the second occurrence of  $d_1$  should be  $d_2$ .
- 498, 8 Delete one of the commas following  $x$ .
- 501, 10 Change  $p_n x_n$  to  $p_i x_i$ .
- 505, 10 Change “all prime numbers” to “all prime numbers greater than two”.
- 505, 11 Change “if a number is prime” to “if a number is prime and greater than two”.