Chapter 1: Sets and Spaces

p. 9 Example 1.8: Add "and" after output. That is, let y denote the quantity of output and $\mathbf{x}$ denote the quantities of the various inputs.

p. 9 Exercise 1.12: $\mathbf{x}' \geq \mathbf{x}$ means $x'_i \geq x_i$ for every i.

p. 28 Rephrase the definition of sublattice: A subset S of L is a *sublattice* of L if for every x, y in S, the join $x \vee y$ and meet $x \wedge y$ (with respect to L) are in S.

p. 32 Exercise 1.55: A weakly ordered set has *at* most one best element. True or false?

p. 36 Exercise 1.60 (Field expansion lemma): Substitute $\succsim$ for $\succ$. That is, a group S of individuals is *decisive* over a pair of alternatives $x, y \in X$ if

$$x \succsim_i y \text{ for every } \ i \in S \implies x \succsim y$$

p. 45 Exercise 1.75: Can substitute *best element* for *maximal element*.

p.101 Example 1.97: Substitute $w(\{i\})$ for $v(\{i\})$. Similarly, substitute $w(N)$ for $v(N)$ in the second last line.

p.130 Exercise 1.229: Move "finite-dimensional". If S is a finite-dimensional convex set in a normed linear space

$$S \neq \emptyset \implies \text{ri } S \neq \emptyset$$

Chapter 2: Functions

p.166 Line 12: "total supply of goods available at the end of period t " (not "k").

p.194 In Exercise 2.41, the characteristic function should be denoted w not v.

p.195 In Example 2.66, The input requirement sets of a single output technology are a *descending* correspondence provided the technology exhibits free disposal.

p.197 In Exercise 2.43, $\Theta \subseteq \Re$ and the parameters θ are scalars not vectors. That is, the exercise should read: For $\Theta \subseteq \Re$, if $g \in F(\Theta)$ is increasing, then the correspondence

$$G(\theta) = \{\, x : 0 \leq x \leq g(\theta) \,\}$$

is increasing.

p.199 Exercise 2.51: Add the following hint: First show that

$$f(x_1 \vee x_2)g(x_1 \vee x_2) \geq f(x_2)g(x_1 \vee x_2) + \big(f(x_1) - f(x_1 \wedge x_2)\big)g(x_1)$$

p.225 Exercise 2.101: Substitute x for $\mathbf{x}$. That is,

$$\varphi(x) = K \text{ for every } \ x \in X$$

p.234 In Figure 2.24, x^- should be $\tilde{x}$.

Chapter 3: Linear Functions

p.270 Line 5: Delete "if" after full. That is, an $m \times n$ matrix has full rank if rank $A = \min\{m, n\}$.

p.293 It would be more intuitive to express the inequality in Exercise 3.72 as

$$(\mathbf{y} - \mathbf{x}_0)^T(\mathbf{x} - \mathbf{x}_0) \leq 0 \text{ for every } \mathbf{x} \in S \tag{3.1}$$

$\mathbf{y} - \mathbf{x}_0$ forms an obtuse angle with $\mathbf{x} - \mathbf{x}_0$ for every $\mathbf{x} \in S$. However, the direction given in the text is the one used in establishing the separating hyperplane theorem (Exercise 3.182).

p.293 In Exercise 3.73, the unique closest point $\mathbf{x}_0$ also satisfies the inequality (3.1). The proof is identical to the finite-dimensional case (Exercise 3.72).

p.301 A bracket is misplaced in equation (10). It should read $\lambda = \max_{\mathbf{x} \in S} f(\mathbf{x})^T \mathbf{x}$.

p.301 In the first line of the proof of Proposition 3.6, the eigenvector should be labelled $\mathbf{x}_1$ (not $\mathbf{x}_0$). Similarly, $S = \{\mathbf{x}_1\}^\perp$.

p.334 Proof of Proposition 3.8 should cite Exercises 3.137, 3.138 and 3.140. Exercise 137 shows that a convex function that is bounded above in the neighourhood of a single point is continuous at that point. Exercise 138 shows that a convex function that is bounded above in the neighourhood of a single point is bounded above in a neighbourhood of every point of its domain. Exercise 140 combines these two steps to show that a convex function that is bounded above at a single point is continuous on its domain.

p.336 Delete Carathéodory's Theorem from the hint for Exercise 3.141.

Chapter 4: Smooth Functions

p.456 Exercise 4.49: Assume $c(0) = 0$ not $c(y) = 0$.

p.479 In the second line from the bottom, insert "to" after "extend it". Delete one "are more". The sentence should read: To usefully apply the inverse function theorem to economic models, we need to extend it to systems in which there are more variables than unknowns.

Chapter 5: Optimization

p.502 Example 5.3:*For a male*, having a son is a sufficient condition for being a father.

p.507 Line 8: Insert "interior" before "local maximum". That is, for a point $\mathbf{x}^*$ to be an *interior* local maximum of a function f, it is necessary that the gradient be zero and the Hessian be nonpositive definite.

p.508 Proof of Corollary 5.1.2: For completeness, add the following sentence. Conversely, if $\mathbf{x}^*$ is an interior global optimum, it must be an interior local optimum. Therefore (Theorem 5.1), $\nabla f(\mathbf{x}^*) = \mathbf{0}$.

p.511 Example 5.10: The Hessian of f is

$$H = \begin{pmatrix} -6x_1 & 3e^{x_2} \\ 3e^{x_2} & 3x_1e^{x_2} - 9e^{3x_2} \end{pmatrix}$$

which evaluates to

$$H = \begin{pmatrix} -6 & 3 \\ 3 & -6 \end{pmatrix}$$

at the point $(1, 0)$.

p.516 In Section 5.3, there should be an explicit assumption that X is open.

p.545 Section 5.3.6: The net benefit approach requires that the Lagrangean be concave, to ensure that the stationary points of the Lagrangean are global maxima (Corollary 5.1.2). Therefore, this section should be really be read as a subsection of Section 5.4.5 on concave programming.

Consequently, Example 5.27 is a bad choice to illustrate this section, since the Lagrangean is not concave. The Lagrange multiplier method identifies the correct solution to the problem, but the optimal solution is a saddle point of the Lagrangean, not a maximum.

p.555 Example 5.30: The complementary slackness conditions following equation (58) should read

$$\begin{array}{lll} x_1 + 2x_2 - 2 \leq 0 & \lambda_1 \geq 0 & \lambda_1(x_1 + 2x_2 - 2) = 0 \\ -x_1 + x_2^2 - 1 \leq 0 & \lambda_2 \geq 0 & \lambda_2(x_1 - x_2^2 + 1) = 0 \end{array}$$

That is, change the last "-1" to "$+1$".

There are in fact two points at which both constraints are binding. In addition to the point $x_1 = 0, x_2 = 1$, there is a second solution to the equations

$$x_1 + 2x_2 = 2 \text{ and } -x_1 + x_2^2 = 1$$

namely, $x_1 = 8, x_2 = -3$. In this case, corresponding Lagrange multipliers are $\lambda_1 = -23, \lambda_2 = -55$. Since these are both negative, $x_1 = 8$ and $x_2 = -3$ cannot be a local optimum either. We correctly conclude that at least one of the constraints must be slack at the optimum.

p.558 Line 5 from bottom: Substitute $s > r$ for $r > s$. That is, given that $s > r$, (60) ensures that $\lambda \neq 1$.

p.560 Exercise 5.26: Replace the last sentence with: We will show later (example 5.41) that a constraint qualification condition is satisfied, so that the the Kuhn-Tucker conditions are necessary for an optimal solution.

p.567 Line 4 from bottom: Substitute "output" for "electricity".

p.581 Example 5.41: In the consumer's problem with nonegativity constraints, the constraints are linearly *dependent*. Consequently, replace the last two sentences beginning "Provided that . . ." with:

These $(n + 1)$ vectors must be linearly dependent in $\Re^n$, so that the regularity condition is not satisfied. However, Corollary 5.4.1 applies — the budget constraint $g(\mathbf{x}) = \mathbf{p}^T\mathbf{x} \leq m$ is linear and therefore concave.

p.588 In line 5, substitute corollary 5.5.2 for theorem 5.5.1. That is, the standard linear programming problem satisfies the hypotheses of corollaries 5.4.1 and 5.5.2.

Chapter 6: Comparative Statics

p.616 Exercise 6.5: The first property should read

$$D_p y^*[\mathbf{w}, p] \geq 0 \qquad \text{Upward sloping supply}$$

p.625 Insert "−" in the second and fifth equations, that is

$$J_g = -J_f^{-1} K_f$$

Acknowledgements

I wish to thank the following for identifying errors in the published manuscript: Philip Gunby, Tomoo Kikuchi, Flavio Menezes, Jörg Naeve, Martin Osborne, and Paul Walker.