We thank all readers for sending us their corrections.

In particular, we gratefully acknowledge contributions from Dennis Epple, Jan Kara, Benoit Larose, Reza Naserasr, Gábor Simonyi, Jacobus Swarts and Xuding Zhu. Please note that these corrections have already been made in the second printing of the book. If you have the second printing, please look at the accompanying file entitled "Errata for the Second Printing".

1 CHAPTER 1

- On page 11, replace "the height of u and the height of v" by "the level of u and the level of v", just above Proposition 1.14.
- On page 17, eliminate any reference to extending the mapping β to sets of edges. Instead, simply say that "if the desired bijective mapping β between $E(G)$ and $E(H)$ exists, then the number of copies of any particular A is the same in G and H." This is what is proved by counting and it is exactly the statement needed in the middle of page 18.
- On page 18 line 8, correct the parenthesis as follows: (the sums are now over subsets A of $E(H)$).
- The second statement of Exercise 7 on page 35 should be this: Prove that $\hom(G, H) = \sum_Q \mathrm{sur}(G, Q)$, where the summation is over all subgraphs Q of H.

2 CHAPTER 2

- On page 42, just above Theorem 2.9, modify the paragraph as follows:

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  Another very useful technique from linear algebra relies on matchings. An *induced matching* M in a graph G is a set of disjoint edges x_iy_i, $i = 1, 2, \cdots, k$, of G such that there are no other edges amongst the set of vertices $x_i, y_j, i = 1, 2, \cdots, k, j = 1, 2, \cdots, k$. A *soft matching* M in a graph G is a sequence of (not necessarily disjoint or even distinct) edges x_iy_i, $i = 1, 2, \cdots, k$, of G such that $x_iy_j \notin E(G)$ whenever $i < j$. Note that in a soft matching each edge is ordered, as it matters which of its ends is listed first and which second. In particular, if $x_1y_1, x_2y_2, \cdots, x_ky_k$ is an induced matching in G, then $x_1y_1, x_2y_2, \cdots, x_ky_k, y_1x_1, y_2x_2, \cdots, y_kx_k$ is a soft matching in G.

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  Then on pages 42 and 43 replace "strict matching" by "soft matching", once in the statement of Theorem 2.9, once in its proof, and once above Corollary 2.10. Finally, also above Corollary 2.10, the "union of 2^m disjoint copies of K_2" should read "the union of 2^{m-1} disjoint copies of K_2".

- On page 44, Corollary 2.12, the reference in the second line of the proof should be to Corollary 2.3, not 1.27.

- In the middle of page 45, we let $\mathrm{inj}_d(G, \overline{H})$ denote the sum

$$\sum_{|D|=d} \mathrm{inj}_D(G, \overline{H});$$

(the bar over H was missing).

- On page 46, about mid-page, f is a loop of H^G (not G^H).

- On page 47, in the proof of Proposition 2.17, G^H should be H^G, in three places.

- On page 48, the second paragraph of the proof of Lemma 2.21, c can be viewed as an assignment in which adjacent vertices obtain *distinct* (not disjoint) subsets; and u is any element of the set $c(x) - c(y)$.

- On page 49, the proof of Lemma 2.22, the first paragraph should read as follows:

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  We proceed by induction on ℓ. Indeed, the statement is trivial when $\ell = 1$. Hence consider an odd cycle C in $R(n, \ell)$. It consists of vertices $r_1, r_2, \cdots, r_t$ (t odd) of $R(n, \ell)$. Thus the strings $r_1, r_2, \cdots, r_t$ are arcs of $\vec{R}(n, \ell - 1)$, and for each consecutive pair r_i, r_{i+1} of arcs, the head of one equals the tail of the other. This defines a closed walk in $\vec{R}(n, \ell - 1)$, which contains t distinct arcs. This closed odd walk must contain an odd cycle of $R(n, \ell - 1)$. We now observe that the closed walk $r_1, r_2, \cdots, r_t$ is itself not a cycle in $R(n, \ell - 1)$, and hence the odd cycle has fewer than t vertices, so that we can apply the induction hypothesis. (The observation follows from the fact that the arc that is the lexicographically smallest string has both its neighbours in C have tails equal to its head, and the arc that is the lexicographically largest string has both its neighbours in C have heads equal to its tail, cf. Fig. 2.6.)

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  Furthermore, the caption for FIG. 2.6. should read "A five-cycle in $R(n, 2)$ corresponds to a closed walk with five arcs in $\vec{R}(n, 1) = \vec{T}_n$."

- On page 50, in lines 3 and 4 we should say "the values $c(u, x), x \in V(K_k)$, are all distinct."

- On page 55, the proof of Proposition 2.38 should read as follows:

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  Let G be the transitive tournament $\vec{T}_{k+1}$ with vertices $1, 2, \cdots, k, k + 1$ and arcs ij for all $i < j$, and let H be obtained from G by reversing the arc 14. Then $G \not\to K$ and $H \not\to K$, because the underlying graphs of G and H are not k-colourable. However, the digraph $G \times H$ is k-colourable as follows. Colour vertices $(1,1)$, $(2,1)$, $(3,4)$, $(4,4)$ by 1, vertices $(1,3)$, $(1,2)$, $(2,2)$, $(3,2)$, $(3,1)$, $(4,1)$ by 2, vertices $(1,4)$, $(2,4)$, $(2,3)$, $(3,3)$, $(4,3)$, $(4,2)$ by 3, and all other vertices (i,j) (having $\max(i,j) \geq 5$) by $\max(i,j)$.

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- On page 56, in the first paragraph of Theorem 2.40, we should have said that "the Lemma 2.21 also implies that $\chi(L(G \times H)) \geq c$." (Instead of $\chi(L(G) \times L(H)) \geq c$.)

  Furthermore, Corollary 2.42 should state that "$\lim_{k\to\infty} u(k) = \infty$" (instead of the limit of $d(k)$).

- On pages 56–57, the second part of the proof of Corollary 2.42 should read as follows:

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  On the other hand, if G, H are graphs and G', H' are arbitrary orientations of G and H respectively, then the edge set of $G \times H$ is partitioned into the edge sets of the underlying graphs of $G' \times H'$ and $G' \times H'^{-1}$. Thus

  $$\chi(G \times H) \leq \chi(G' \times H') \cdot \chi(G' \times H'^{-1})$$

  (cf. Exercise 11 in Chapter 1, implying that $u(k) \leq (d'(k))^2$. Corollary 2.41 implies that $d'(k)$ is either bounded by three or is unbounded, and we may conclude that $u(k)$ is either bounded by nine or is unbounded.

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- On page 58, line 11, we should have said that "$(z_1, z_2, \cdots, z_{t+1})$ is adjacent to $(y_1, y_2, \cdots, y_{t+1})$ in $V(K_n^{t+1})$" (and not $V(K_n^t)$).

- On page 58, the proof of Corollary 2.45 should read as follows: "The mapping $\phi(x) = f(x, x, \ldots, x)$ is an automorphism of K_n, and $\phi^{-1} \circ f$ is an idempotent homomorphism of K_n^t to K_n, hence equal to some projection π_i. Thus we have $f = \phi \circ \pi_i$, which completes the proof."

- On page 61, line 1 should begin as follows: "If P is any path joining u and v in G, different from the paths P_1, P_2".

- On page 61, line 12, the chromatic number of G is greater than than two (not three).

- On page 62, line 6, the replacing paths have *odd* (not even) length.

- On page 64, line 5, we should say $r(d) = c$, not $r(d) = b$, and all remaining references to b in that proof should be refer to c.

- On page 68, lines 4–5 of Section 2.11, the role of u and v is mixed up. The assumption should be "If every neighbour of v (including v itself) is also a neighbour of u"
- On page 70, the proof of Proposition 2.61 should end this way:

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  It is easy to see that ϕ_k is the constant mapping onto v. It is also easy to see that each pair ϕ_i, ϕ_{i+1} are connected by a path in $\mathrm{HOM}(G, H)$. Since every vertex of $\mathrm{HOM}(G, H)$ has a path to one fixed vertex, the graph $\mathrm{HOM}(G, H)$ is connected.

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- On page 78, Exercise 8, assume that G and H have at least one arc.
- On page 79, modify Exercise 17 as follows:

  17. [214] Prove that each connected core of girth at least five is projective.

3 CHAPTER 3

- On page 82, line -9, add reference in the paranthesis: "([182]; see also Propositon 3.8)."
- In the second half of the proof of Proposition 3.4 on page 83, argue as follows: For the second assertion, we can use the graphs $S(i, j)$, i odd, from Theorem 2.23. Let $G_1 = S(3, 3)$, and assume we have already constructed $G_1, G_2, \cdots, G_t (t \geq 1)$, where G_t has odd girth g_t and chromatic number c_t. Then we define $G_{t+1} = S(g_t + 2, c_t + 1)$. Because of Corollary **??** and Exercise **??** in Chapter **??**, we know that the graphs $G_1, G_2, \cdots$ are pairwise incomparable.
- The proof of Corollary 3.14 on the bottom of page 86 should have $n = |V(G)| + 1$.
- On page 91, the last line of Corollary 3.19 should end with "$h \circ g_i = f$" (and not $h \circ f_i = f$).

  Furthermore, in the proof of Corollary 3.19 k^{kt} should be replaced by k^{k^t} (twice).
- On page 101, in the proof of Theorem 3.37, $F_i \to H$ should be replaced by $F_i \to G$ (twice).
- On page 102, line 13, P_1, P_2, P_3 should be replaced by $\vec{P}_0, \vec{P}_1, \vec{P}_2$.
- On page 104, just above Proposition 3.43, the bracket that closes after [234] should close only at the end of the paragraph, a line and a half later.

- On page 107, in Exercise 4, ForbC_ℓ consists of all bipartite graphs and all graphs with odd girth greater than ℓ.
- Fig. 3.9 on page 108 (for Exercise 17) is missing one arc from the leftmost to the rightmost of the lowest three vertices in H.

4 CHAPTER 4

- On page 114, replace the second half of the proof of Theorem 4.7 by the following text.

  Let us now estimate the number of graphs on V that admit an automorphism ϕ taking x to y. We claim that ϕ has at most $\binom{n}{2} - cn^2$ pair-orbits, for some positive constant c. Indeed, asymptotically, in almost every graph the degrees are at least $\frac{n}{2}(1-\epsilon)$, and the numbers of common neighbours of any two vertices are at least $\frac{n}{4}(1+\epsilon)$ (for any positive ϵ), according to Theorem **??**. It follows that at least $\frac{n}{2}(1-\epsilon) - \frac{n}{4}(1+\epsilon) = \frac{n}{4}(1-3\epsilon)$ vertices are adjacent to x but not to y. Since ϕ takes x to y, it must move each of these vertices. It follows that the number of pair-orbits of ϕ is at most $k = \binom{n}{2} - cn^2$ where c is a positive constant. It further follows that there are at most 2^k graphs for which ϕ is an automorphism, and at most $2^k n!$ graphs with a nontrivial automorphism. Therefore the proportion of such graphs tends to zero:

  $$\frac{n! \cdot 2^{\binom{n}{2} - cn^2}}{2^{\binom{n}{2}}} \leq \frac{n^n}{2^{cn^2}} \to 0.$$

- On page 140, Exercise 11 should refer to critical *asymmetric* (not rigid) digraphs - defined as asymmetric digraphs G such that each $G - v$ has a nontrivial *automorphism* (not epimorphism).

5 CHAPTER 5

- On page 168, starting on line 13, we should say the following:

  Let $E_k(G)$ denote, for an input digraph G and an integer $k \geq 2$, the following assertion.

  - For any set U of k vertices of G, there exists a consistent mapping $f : U \to V(H)$, and for any such consistent mapping f and any vertex $u' \in V(G) - U$, there exists a consistent mapping f' of $U \cup \{u'\}$ to $V(H)$ which extends the mapping f.

  We note that the assertion $E_2(G)$ is equivalent to the success of the pair consistency check.

We shall prove the theorem by proving that the existence of a majority function for H ensures that, for any input digraph G, the assertion $E_2(G)$ implies all other assertions $E_k(G)$, for $k = 3, \cdots, |V(G)| - 1$.

- Still on page 168, remove the paragraph starting "Suppose first", from line 24 to line 29. Delete the first word "Conversely," from the next paragraph.

- On pages 168-169, any references to pair lists L or L' should be replaced by L^*.

- On page 169, Corollary 5.32 is proved as follows:

  The existence of a majority function on H was shown above to ensure that $E_2(G)$ implies all $E_k(G)$. A conflict f on $U \subseteq V(G)$, with $|U| = k \geq 3$, can be extended from any $u_1, u_2 \in U$ to a homomorphism of G to H. Thus the pair consistency check on G succeeds ($E_2(G)$ holds), and f is consistent. Now applying $E_k(G), E_{k+1}(G), \ldots$, we extend f to a homomorphism of G to H, in contradiction to the fact that f is a conflict. On the other hand, we argue that if no G has a conflict (with respect to H) with more than two vertices, then H has a majority function. Indeed, let G be the product $H \times H \times H$ and U the set of all vertices (a, b, c) in which not all a, b, c are distinct. Let $f(a, b, c) = x$ if at least two of a, b, c are equal to x. Thus mapping does not have any conflicts with one or two vertices, since any two values (such as $f(x, x, y) = y$ and $f(z, z, t) = y$, say) can be extended by a projection (the second projection would work in the above example). Since there are no conflicts with more than two vertices, f extends to a homomorphism, which is a majority function on H.

- On page 188 modify Exercise 10 as follows:

  10. Prove that it is NP-hard to decide whether the core of a digraph is an oriented tree. Prove that it is NP-hard to decide whether a graph is a core.

6 CHAPTER 6

- On page 196, Corollary 6.7 should also assume that p, q are relatively prime and $p/q \geq 2$ (as in Lemma 6.6).

- Pages 209–210: all references to iq should be replaced by $x_i q$ and those to $(i-j)q$ (respectively to $(j-i)q$) by $(x_i - y_j)q$ (respectively by $(y_j - x_i)q$).