

ERRATA

for *Algebraic Combinatorics*, Springer, 2013

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- page 8, Exercise 5, line 3. Change G to H_n .
- page 9, Exercise 13. It should be assumed that G is a simple graph. (Otherwise one has to consider “adjacency with multiplicity”).
- page 13, line 4. Change the first $=$ to \neq .
- page 14, first line after (2.4). Change “ (u, v) -entry of the matrix Φ_Δ ” to “ (u, v) -entry (short for (f_u, f_v) -entry) of the matrix $[\Phi_\Delta]$ ”.
- page 16, line 5. Change $(-1)^{u+w}$ to $(-1)^{u \cdot w}$.
- page 18, Exercise 2(a). Assume that $k \leq n/2$.
- page 22, line 11–. It actually was not previously assumed (though it should have been) that “ G is connected and has at least two vertices.” Moreover, connected graphs are not defined until page 135.
- page 23, line 2–. $\mu(w, v)$ is the same as μ_{wv} (the number of edges between u and v). Also on page 24, equation (3.5) and line 8–.
- page 25, line 2. Change the last \mathbf{B}^{m-1} to \mathbf{B}^{m+1} .
- page 26, line 3. The claim that $0 \leq \sigma_i \leq 1$ is not true. We need to work with the row sums, not the column sums. Essentially, the argument works with \mathbf{N}_i replaced by the transpose \mathbf{N}_i^t .
- page 26, line 4. Change $V\mathbf{N}_iU$ to $V\mathbf{N}_i^tU$.
- page 29, Exercise 8, line 2. Change n^2 to $(n-1)^2$.
- page 29, line 3–. Change $H(u, v)$ to $H_k(u, v)$.
- page 32, line 3–. Change “We call P_i the i th level” to “We call P_j the j th level”. (While this does not affect the meaning, it’s obviously better to keep the notation consistent.)
- page 71, line 11–. Change “Exercise 5” to “Exercise 6.5”.

- page 83, line 7. Add “or *cycle enumerator*” after “*cycle index polynomial*” (since the term “cycle enumerator” is used later in the text).
- page 87, line 10–. Change “is a line” to “in a line”.
- page 93, line 14–. Change $\frac{1}{4}$ to $\frac{1}{8}$.
- page 94, line of table beginning 2, 1, 1. Change (12, 23) to (13, 23).
- page 95, line 4. Change $\sum_{i=0}^{i(i-1)}$ to $\sum_{i=0}^{12}$.
- page 109, line 10–. Change $n - i + 1$ to $i - n - 1$.
- page 110, line 6. Change “from \emptyset to w ” to “from \emptyset to λ ”.
- page 116, line 14–. Change $\sum_{m_k \geq 1}$ to $\sum_{m_k \geq 0}$.
- page 116, line 2–. Change “most r ” to “most s ”.
- page 127, Exercise 14, line 4. Change I to I .
- page 129, line 3–. Although the meaning is clear, for consistency of notation one should change 1 to I .
- page 140, line 9–. Change f_j to f_i .
- page 142, line 7–. Change $p \cdot \det(\mathbf{L}_0)$ to $-p \cdot \det(\mathbf{L}_0)$.
- page 144, lines 9 and 10. Change T_2 to T_1 (twice).
- page 145, line 5–. Change “rooted” to “planted”.
- page 146, figure at top of page. The figure is missing six planted forests at the top level, viz., the six planted forests with one endpoint. There are $3!t(3) = 18$ maximal chains in all.
- page 146, line 10. Change “one” to “zero”.
- page 151, line 14–. Insert before the period at the end of the sentence: “, denoted $\text{init}(e)$ and $\text{fin}(e)$, respectively”.
- page 151, line 13–. Change “Definition 8.5” to “Definition 9.5”.

- page 151, Theorem 10.1. The definition of a connected digraph needs to appear before this theorem. First one should define a *walk* in a digraph in an obvious way analogous to the undirected case. A digraph D is *strongly connected* if it is nonempty and there is a walk from any vertex u to any vertex v . A digraph D is *weakly connected* if it is connected as an undirected graph, i.e., after replacing each directed edge, say from u to v , with an undirected edge incident to u and v . Theorem 10.1 is true with either definition of connectedness.
- page 152, line 11–. Change “unique directed path” to “unique directed walk”. (Otherwise the digraph with vertices $1, 2, 3$, where $v = 3$, and edges $1 \rightarrow 2, 2 \rightarrow 1, 2 \rightarrow 3$ is an unwanted example.)
- page 152, line 9–. Insert after “ $1 \leq i \leq r - 1$.” the parenthetical sentence “(All three of these conditions are considered to be vacuously true if the sequence e_1, \dots, e_r is empty.)”
- page 152, line 7–. Insert before “There is ...” the sentence “From now on, an oriented subtree of D will always mean a subdigraph of D that is an oriented tree with the full vertex set V , or in other words, a *spanning* oriented subtree of D .”
- page 153, line 2. While this line is correct as it stands, it would be logically better to replace “ $\text{init}(e(u)) = u$ ” with “ $\text{init}(e_j) = u$ ”.
- Proof of Theorem 10.4. The induction is not quite correct since in the statement of the theorem it is assumed that D is connected, while D_1 and/or D_2 may not be connected. This problem is easily fixed since the determinant of the reduced Laplacian matrix $\mathbf{L}_0(D)$ of a disconnected digraph D is clearly 0 [why?], and the number of oriented spanning subtrees (with any root) of a disconnected graph is also clearly 0.
- page 156, Example 10.8, line 3. Change a_{2^m} to a_{2^n} .
- page 156, lines 3– to 1–. The definition of D_n is not quite right when $n = 1$, where we need two edges rather than one. It would be better to say that the edges of D_n are binary sequences $a_1 \cdots a_n$ with initial vertex $a_1 \cdots a_{n-1}$ and final vertex $a_2 \cdots a_n$.
- page 157, line 10–. Change $\mathbf{L}(D_n)$ to $\mathbf{L}_0(D_n)$.

- page 157, Lemma 10.9, line 2. Change “walk” to “path”.
- page 158, line 5. To be precise, this definition does not work when $n = 1$.
- page 163, line 3–. Insert “to” before second “do”.
- page 164, line 1. Change “Suppose that C ” to “Suppose that a circuit C ”.
- page 171, line 11–. Change “real matrix” to “real”.
- page 172, line 7. Change $C_{T_1}^*$ to C_{T_1} .
- page 174, line 1–. Change C_T to B_T .
- page 183, diagram of squared square. There is an unlabelled 17×17 square.
- page 184, Exercise 5, line 2. Change “there in” to “there is”.
- page 189, line 1. It should be stated before this sentence that the number of prisoners is $2n$.
- page 190, line 4–. Insert after “*Proof.*” the sentence “Take the vertex set of K_n to be $[n]$.”
- page 190, line 2–. Change $1 \leq i \leq n$ to $1 \leq k \leq n$.
- page 191, line 4 above Section 2.4. Change X to S .
- page 194, line 16. Change “rows of \mathbf{A} ” to “rows of $\mathbf{A} + I$ ”.
- page 195, line 8–. Change $k \geq 2$ to $k \geq 3$.
- page 196, line 6–. insert after z^n the phrase “when n is odd”.
- page 197, line 1–. It is assumed that $R \neq 0$ means $R \neq \{0\}$.
- page 199, first displayed equation. Change \sum to \prod .
- page 201, line 5. Change “an” to “a”.
- page 202, line 3. Remove the first] .

- page 206, Exercise 25(b), line 2. Change $p_m(x)$ to $p_d(x)$.
- page 207, Exercise 28(c). It should be assumed that the rational function $F(x_1, \dots, x_m)$ has a power series expansion $\sum_{i_1, \dots, i_m \geq 0} c_{i_1, \dots, i_m} x_1^{i_1} \cdots x_m^{i_m}$, that is, the formal product of the denominator of $F(x_1, \dots, x_m)$ with the series equals the numerator of $F(x_1, \dots, x_m)$.
- page 209, Hint 2.2. Change this hint to “Give an argument analogous to the proof of Theorem 8.9.”
- page 211, Exercise 9.11, line 1. Change “numberof” to “number of”.
- page 212, **12.26**. Insert “the equation” after “with respect to x ”.