Errata

1. Page 14: the random variables $S_n$ defined here (and mentioned on lines 1, 2, 11 and 14) cause a conflict with the identical notation $S_n$ used to denote the symmetric group of order $n$. They should be relabeled by a different letter, e.g., $Z_n$.

2. Page 72, Exercise 1.6: the fourth line of the exercise text is badly formatted due to an errant LaTeX command. The initial part of the exercise should read:

   (Lifschitz-Pittel [75]) Let $X_n$ denote the total number of increasing subsequences (of any length) in the uniformly random permutation $\sigma_n$. For convenience, we include the empty subsequence of length 0, so that $X_n$ can be written as $X_n = 1 + \sum_{k=1}^{n} X_{n,k}$ where the random variables $X_{n,k}$ are defined in the proof of Lemma 1.4 (p. 9).

3. Page 76, Exercise 1.15: change “$Q(n) = \sum_{k=1}^{n} q(n)$” to “$Q(n) = \sum_{k=1}^{n} q(k)$”.

4. Page 76, Exercise 1.15(a): change “Prove that $q(n,k) \leq \frac{1}{k!} (\binom{n+k-1}{k-1})$” to “Prove that $q(n,k) \leq \frac{1}{k!} (\binom{n-1}{k-1})$. (Note: the bound $q(n,k) \leq \frac{1}{k!} (\binom{n+k-1}{k-1})$ also implies that $q(n,k) \leq \frac{1}{k!} (\binom{n-1}{k-1})$, so the uncorrected version of the exercise is still technically correct.)

5. Page 90: in equation (2.13), change the numerator of the fraction on the right-hand side from “$\prod_{1 \leq i,j \leq d} (p_i - p_j)(q_i - q_j)$” to “$\prod_{1 \leq i,j \leq d} (p_i - p_j)(q_i - q_j)$”.

6. Page 118: in the equation immediately above Lemma 2.24, a factor of $e^{-\frac{2}{3} x^{3/2}}$ is missing.

7. Page 118: in Lemma 2.24, display (2.75) should read:

\[ |A(x,y)| \leq C \exp \left( -\frac{1}{2} (x^{3/2} + y^{3/2}) \right) \]  (2.75)

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8. Page 119: in the proof of Lemma 2.25, display (2.76) should read:
\[
\left| \det_{i,j=1}^{n} (A(x_i, x_j)) \right| = \exp \left( -\sum_{j=1}^{n} x_{j}^{3/2} \right) \left| \det_{i,j=1}^{n} \left( e^{(x_{i}^{3/2} + x_{j}^{3/2})/2} A(x_i, x_j) \right) \right|
\leq n^{n/2} C^n \exp \left( -\sum_{j=1}^{n} x_{j}^{3/2} \right),
\] (2.76)

9. Page 122: the display in which \( E_1 \) is bounded should read:
\[
E_1 \leq C \exp \left( -\frac{1}{2} (x + T)^{3/2} - \frac{1}{2} (y + T)^{3/2} \right),
\]

10. Page 126: display (2.89) should read:
\[
|a_n(T, \infty)| \leq \int_{T}^{\infty} \cdots \int_{T}^{\infty} C^n e^{-\sum_{j=1}^{n} x_{j}^{3/2}} \det_{i,j=1}^{n} \left( e^{x_{i}^{3/2}/2 + 1/2 x_{j}^{3/2}} A(x_i, x_j) \right) dx_1 \cdots dx_n
\leq \left( C \int_{T}^{\infty} e^{-x^{3/2}} dx \right)^{n} n^{n/2} \leq C^n e^{-nT} n^{n/2}.
\] (2.89)

11. Page 128: In Lemma 2.31, change “Let \( P_1 \geq P_2 \geq P_3 \geq \ldots \)” to “Let \( P_0 \geq P_1 \geq P_2 \geq \ldots \)”.

12. Page 129: the line following display (2.97) should be changed from “By Lemma 2.32, for fixed \( t \) the sequence \( P_1(t), P_2(t), \ldots \) is nonincreasing.” to “By Lemma 2.32 (and its trivial extension to cover the case \( n = 0 \)), for fixed \( t \) the sequence \( P_0(t), P_1(t), P_2(t), \ldots \) is nonincreasing.”

13. Page 129: in the line following display (2.98), change “But by Theorem 2.47” to “But by Theorem 2.29”.

14. Page 134: the first display in the proof of Lemma 2.34 should read:
\[
|F_2(t) - 1| \leq \sum_{n=1}^{\infty} \frac{C^n n^{n/2}}{n!} \left( \int_{t}^{\infty} e^{-x^{3/2}} dx \right)^{n} \leq \sum_{n=1}^{\infty} \frac{C^n e^n}{n^{n/2}} e^{-nt} = O(e^{-t}).
\]

The display following it should read:
\[
|H(x, y, t) - A(x, y)| \leq \sum_{n=1}^{\infty} \frac{(n + 1)(n+1)/2 C^{n+1}}{n!} e^{-x^{3/2} - y^{3/2}} \left( \int_{t}^{\infty} e^{-u^{3/2}} du \right)^{n}
\leq e^{-x-y} \sum_{n=1}^{\infty} \frac{(n + 1)(n+1)/2 C^{n+1}}{n!} e^{-nt},
\]

16. Page 251, line 10—: change “u(x, 0) = u(x)” to “u(x, 0) = u(x)”.

17. Page 292, line 4—: change $p_0 = (1, 1)^{1/2}$ to $p_0 = (1, 1)^{-1/2}$

18. Page 295: in line 11—,

$$p_n(x) = (A_n x + B_n)p_{n-1}(x) - D_n p_{n-2},$$

to

$$p_n(x) = (A_n x + B_n)p_{n-1}(x) - D_n p_{n-2}(x),$$

and in the sentence on the following line that starts “The value of $D_n$ can be found by assuming inductively that (5.23) holds and writing”, delete the words “assuming inductively that (5.23) holds and”.

A few lines further down, the last line of the proof of Lemma 5.14 should be changed to: “which gives that $D_n = A_n^{\kappa_{n-2}} = \frac{\kappa_n\kappa_{n-2}}{\kappa_{n-1}^2} = C_n$ for $n \geq 2$, as claimed. For $n = 1$ it is not necessary to show that $D_1 = C_1$, since $p_{-1}$ was defined as the zero polynomial.”

19. Page 296, line 4: change the equation

$$(K_nf)(x) = \int_{\mathbb{R}} K_n(x, y)f(y) \, dy$$

to

$$(K_nf)(x) = \int_{\mathbb{R}} K_n(x, y)f(y)w(y) \, dy$$

20. Page 296, equation (5.24): change “$\left(\sum_{i=1}^{m} u_i u_j p_k(x_i)\right)^2$” to “$\left(\sum_{i=1}^{m} u_i p_k(x_i)\right)^2$”.

21. Page 302, equation (5.31): in this equation, change $L_n(x)$ to $L_n^\alpha(x)$ and $L_m(x)$ to $L_m^\alpha(x)$.