

ERRATA SHEET FOR “RANDOM MATRICES AND THE SIX-VERTEX MODEL”

1. INTRODUCTION

- Page viii, in the middle, “In Chapter 4 we introduce ... with ~~with~~”.
- Page viii, in the middle, “In Chapter 5 we derive ... with ~~with~~”.

2. CHAPTER 1

- Page 9, line -3. derive \mapsto to derive
- Page 15, equation (1.4.23). The formula should read

$$\frac{\partial^2}{\partial u_1^2} \tilde{Z}_N = -N \left(\frac{\partial}{\partial u_1} \tilde{Z}_N \right) \left(\sum_{j=0}^{N-1} \beta_j \right) - N \tilde{Z}_N \sum_{j=0}^{N-1} N (\gamma_j^2 - \gamma_{j+1}^2).$$

- Page 15, equation (1.4.24). Lowercase n should be changed to uppercase N in three places.

3. CHAPTER 2

- Page 26, equation (2.3.34). The formula for c is incorrect. It should be

$$c = \frac{2t + (t^2 + 12)^{1/2}}{3}.$$

- Page 40, lines 3, 4 after (2.4.101), and page 41 two lines above (2.4.109). β_j should be b_j .

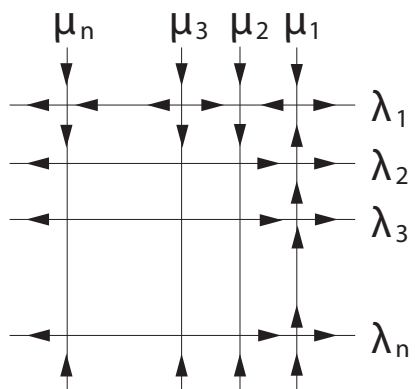
4. CHAPTER 4

- Page 83, equation (4.2.4). m should be n .

5. CHAPTER 5

In Chapter 5, there is a problem that the figure 5.10 does not match the exposition. It can be dealt with in the following way:

- Lines 5 and 6 of chapter 5: Change “and the columns from left to right” to “and the columns from right to left.”
- In figures 5.1, 5.9, and 5.10, the columns should be numbered from right to left, rather than left to right.
- Page 101: Change the last words of page 101 from “upper left-hand” to “upper right-hand”.
- Page 94 equation (5.0.8): In denominator, change $\sinh(\lambda_j - \lambda_k)$ to $\sinh(\lambda_k - \lambda_j)$.
- Page 95 equation (5.0.10): In denominator, change $\sin(\lambda_j - \lambda_k)$ to $\sin(\lambda_k - \lambda_j)$.
- Page 104 equation (5.4.4): In denominator, change $\sin(\lambda_j - \lambda_k)$ to $\sin(\lambda_k - \lambda_j)$ in two places.



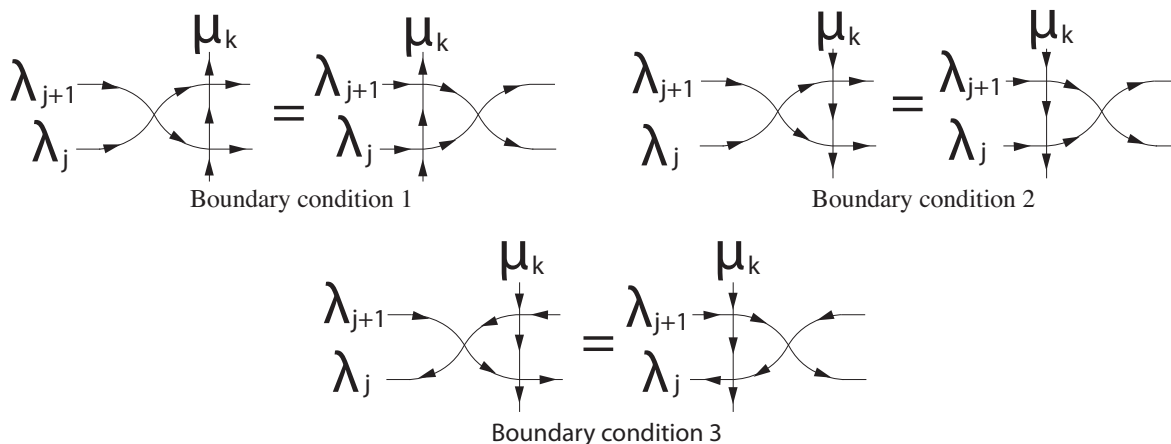
- Page 105 equation (5.4.10): In denominator, change $\sin(\lambda_j - \lambda_k)$ to $\sin(\lambda_k - \lambda_j)$.
- Page 105 equation (5.4.11): Change $\cos(\lambda_j - \lambda_k)$ to $\cos(\lambda_k - \lambda_j)$.
- Figure 5.10 should be reflected about the vertical axis, as shown above.

There are also some minor typos in Chapter 5:

- Page 89, equation (4.4.4). The condition should be

$$|t| < \gamma < \frac{\pi}{2}.$$

- Page 95, line 4 after equation (5.0.10). “is possible” should be “it is possible”.
- Page 95, equation (5.0.11). In line 4 after condition (3), change $\lambda_j = \mu_k + \gamma$ to $\lambda_j = \mu_k - \gamma$.
- Page 95, equation (5.0.12). In the second line in equation (5.0.12) the arguments in the function b should be λ_j and μ_k , not λ and μ .
- Page 98, Figure 5.4. Boundary conditions 1 and 3 are the same. Boundary condition 3 should be as Boundary condition 4, with outer vertical arrows reversed, as shown below.



6. CHAPTER 6

- Page 122, equation (6.3.76). The function $r_n(x)$ has not been defined, so it is better to replace

$$\begin{aligned} \rho_n^1(x) = & - \frac{\sqrt{(x - \alpha_n)(\beta_n - x)}}{2\pi^2} \int_{\alpha_n}^{\alpha+2r} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}} \\ & - \frac{\sqrt{(x - \alpha_n)(\beta_n - x)}}{2\pi^2} \int_{\alpha+2r}^{\beta-2r} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}} \\ & - \frac{\sqrt{r_n(x)}}{2\pi^2} P.V. \int_{\beta-2r}^{\beta_n} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}}. \end{aligned}$$

with

$$\begin{aligned} \rho_n^1(x) = & - \frac{\sqrt{(x - \alpha_n)(\beta_n - x)}}{2\pi^2} \int_{\alpha_n}^{\alpha+2r} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}} \\ & - \frac{\sqrt{(x - \alpha_n)(\beta_n - x)}}{2\pi^2} \int_{\alpha+2r}^{\beta-2r} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}} \\ & - \frac{\sqrt{(x - \alpha_n)(\beta_n - x)}}{2\pi^2} P.V. \int_{\beta-2r}^{\beta_n} \frac{f(nu)du}{(x - u)\sqrt{(u - \alpha_n)(\beta_n - u)}}. \end{aligned}$$

- Page 124, equation (6.3.90). In the second equation it should be β , not α : Instead of

$$\alpha_n = \alpha - n^{-2}\Delta + \mathcal{O}(n^{-3}), \quad \beta_n = \alpha + n^{-2}\Delta + \mathcal{O}(n^{-3}),$$

it should be

$$\alpha_n = \alpha - n^{-2}\Delta + \mathcal{O}(n^{-3}), \quad \beta_n = \beta + n^{-2}\Delta + \mathcal{O}(n^{-3}),$$

- Page 129, equation (6.4.6). In the first equation it should be e^{nl_n} , not e^{-nl_n} : Instead of

$$h_{nn} = -2\pi i e^{-nl_n} [\mathbf{T}_1]_{12}, \quad h_{n,n-1} = -\frac{2\pi i e^{nl_n}}{[\mathbf{T}_1]_{21}}.$$

it should be

$$h_{nn} = -2\pi i e^{nl_n} [\mathbf{T}_1]_{12}, \quad h_{n,n-1} = -\frac{2\pi i e^{nl_n}}{[\mathbf{T}_1]_{21}}.$$

- Page 131, equation (6.4.15). In the first equation it should be e^{nl_n} , not e^{-nl_n} : Instead of

$$h_{nn} = -2\pi i e^{-nl_n} [\mathbf{S}_1]_{12}, \quad h_{n,n-1} = -\frac{2\pi i e^{nl_n}}{[\mathbf{S}_1]_{21}}.$$

it should be

$$h_{nn} = -2\pi i e^{nl_n} [\mathbf{S}_1]_{12}, \quad h_{n,n-1} = -\frac{2\pi i e^{nl_n}}{[\mathbf{S}_1]_{21}}.$$

- Page 131, line 6. It should be “ $\mathbf{M}_n(z)$ is analytic in $\mathbb{C} \setminus [\alpha_n, \beta_n]$ ”, not “ $\mathbf{M}_n(z)$ is analytic in $\mathbb{C} \setminus [\alpha_n, \beta_q]$ ”.

- Page 135, equation (6.5.13). It should be $e^{in\omega}$, not $e^{-in\omega}$:

$$e^{-nG_n(iy/n)} = e^{in\omega} k_n(y) \frac{\sin\left(\frac{\pi y}{2\gamma}\right)}{\sin\left(y\left(\frac{\pi}{2\gamma} - 1\right)\right)} (1 + \mathcal{O}(n^{-1})),$$

7. CHAPTER 7

- Page 176, equation (7.6.19). There is a sign error in the formulas for j_{12}^α and j_{12}^β . They should read

$$j_{12}^\alpha = \frac{i}{2} [3(\gamma^2(z) + \gamma^{-2}(z))(\vartheta_{11}^2 + \vartheta_{12}^2) + (\gamma^2(z) - \gamma^{-2}(z))\vartheta_{11}\vartheta_{12} + 6(\vartheta_{11}^2 - \vartheta_{12}^2)],$$

and

$$j_{12}^\beta = -\frac{i}{2} [3(\gamma^2(z) + \gamma^{-2}(z))(\vartheta_{11}^2 + \vartheta_{12}^2) + (\gamma^2(z) - \gamma^{-2}(z))\vartheta_{11}\vartheta_{12} + 6(\vartheta_{11}^2 - \vartheta_{12}^2)].$$

8. CHAPTER 9

- Page 214, equation (9.3.4). Replace the period at the end of this line with a comma.