SEMICLASSICAL PHYSICS

by

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(Addison-Wesley, Reading, U.S.A., 1997)

(ISBN 0-201-48351-3)

Dear readers of our book,

we apologize for the misprints that have escaped our notice before sending the manuscript to print.

Below you find a list of the errata which we are aware of as of today. (We have not included in this list a number of obvious typographic errors which cause no confusion.) Also, in connection with boundary conditions for billiards and cavities, the name "von Neumann" should be replaced everywhere by "Neumann". (These were two different scholars.)

We would appreciate if you could inform us of any other misprints or errors you run across. Please communicate them to the e-mail address given below, from which the newest update of the Errata will be available also in the future. We are very grateful to Ch. Amann, S. Fedotkin, H. Friedrich, E. Heller, G. Ingold, S. Kümmel, J. Law, A. Magner, P. Meier, M. V. N. Murthy, W. Plaum, J. Sakhr, M. Sieber, D. Sprung, F. Steiner, J. E. Sträng, K. Tanaka, R. Winkler, and B. van Zyl who have contributed to the list.

A revised and slightly extended paperback edition of our book has appeared in January 2003 (Westview Press, Boulder, CO, USA). All errors and misprints known to us until the end of 2002 have been corrected in this edition. But we keep updating the present Errata list for those readers who are in possession of the old edition.

Regensburg, May 24, 2004

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The newest update of this postscript file can also be found on M. Brack's home page:
http://homepages.uni-regensburg.de/~brm04014/book/index.html

ERRATA and updated References to the first printing (March 1997):

2nd front page: line 3: University of Regensburg

p. 4: line 9: [72] $\rightarrow$ [18]

p. 5: line 11: ... will be replaced by ...

p. 6: line 2: $\exp(-i\delta t_1 \hat{H}/\hbar) \simeq 1 - i\delta t_1 \hat{H}(\hat{q},\hat{p})/\hbar$

p. 8: last three lines before Eq. (1.28): This involves the rapidly oscillating function $\exp[iS(q,q;E)/\hbar]$, where the action $S(q,q';E)$ is defined by Eq. (1.23), and can be done by stationary phase integration. In writing the stationary phase condition, it is important to vary both limits of the integral (1.23) which gives

p. 11: line 4 after Eq. (1.38): [22] $\rightarrow$ [30]

p. 21: line 2: $\exp(-iE_n t/\hbar)$

p. 22: line 4: [84] $\rightarrow$ [51]

p. 22: correct the denominator of the first exponent:

$$\Psi(t) = \frac{1}{\sqrt{2\pi\sigma^2}} \sum_{n=1}^{\infty} \exp\left[-\frac{(n-\bar{n})^2}{4\sigma^2}\right] \psi_{nlm}^{(c)} \exp(-iE_n t/\hbar)\,, \tag{1.75}$$

where $\bar{n}$ is the mean, and σ is the standard deviation of the distribution, ...

p. 22: line 2 of second paragraph: $\sigma = 2.5$

p. 22: line 4 after Eq. (1.76): according to Eq. (1.75).

p. 23: in caption of Figure 1.7: (from [50]), $\sigma = 2.5$

p. 41: line 2: ... of an excited quantum state with a classical orbit in a ...

p. 41: Change caption of Fig. 1.19: Probability density of some quantum states (left) and classical orbits (right) in a lemon-shaped billiard. (From [12].)

p. 51: change $\omega_L \rightarrow \Omega_L$:

$$H = \frac{p^2}{2m} + \frac{m}{2}\,\Omega_L^2\, r^2 - \Omega_L L_z\,, \tag{1.129}$$

$$\Omega_L = \frac{eB}{2mc} \tag{1.130}$$

p. 53: correct references:

[4] R. P. Feynman, Rev. Mod. Phys. **20**, 367 (1948).

[12] E. J. Heller and S. Tomsovic, Physics Today, July 1993, p. 38.

p. 55: in Ref. [60]: Kleepner $\to$ Kleppner

p. 55: in Ref. [61]: Weibusch $\to$ Wiebusch

p. 55: in Ref. [63]: Weibusch $\to$ Wiebusch, Wegle $\to$ Welge

p. 55: in Ref. [74]: Nature **973** $\to$ Nature **373**

p. 55: in Ref. [75]: **A 24** $\to$ **B 24**

p. 55: [76] S. W. McDonald, ...

p. 59: line 4 after Eq. (2.10): [8] $\to$ [5]

p. 60: correct the sign:

$$\dot{P}_i = -\frac{\partial H}{\partial Q_i} = 0\,. \tag{2.16}$$

p. 63: bold face for vectors:

$$\mathcal{A}_2(\mathbf{q},\mathbf{P}) = \left[(2\pi\hbar)^{-N} \det\left|\frac{\partial^2 F_2(\mathbf{q},\mathbf{P})}{\partial P_i \partial q_j}\right|\right]^{1/2}. \tag{2.39}$$

p. 63: line 4 from below: Wigner $\to$ Wentzel

p. 65: change summation index:

$$R(q_i,t) = \sum_j \int_0^{q_j} p_j\, dq_j - Ht\,. \tag{2.51}$$

p. 67: line 4 of first paragraph: ... in Sect. 2.2.

p. 70: line 2 after Eq. (2.72): $B = iC\exp(-i\pi/4)$, $A = -iC\exp(i\pi/4)$, ...

p. 72: beginning of line at bottom: $\lambda = h/p$

p. 73: first line after eq. (2.83): $|\partial\lambda/\partial x| \ll 2\pi$.

p. 76: line 3: The integral in Eq. (2.94) then yields

p. 76: line before Eq. (2.97): ... for *all* l in Q_l

p. 76: put tilde on Q:

$$p_r(r) = \hbar\tilde{Q}_l(r) = \left\{2m\left[E - V(r) - \frac{\hbar^2}{2mr^2}l^2\right]\right\}^{1/2}. \tag{2.99}$$

p. 77: correct arguments on r.h.s.:

$$\cos(\phi_l(r_1,r) - \pi/4) = \pm\cos\left(\phi_l(r,r_2) - \pi/4\right)\,. \tag{2.101}$$

p. 78: line after Eq. (2.107): $k(r)$ is given by Eq. (2.92) with V_0 replaced by $V(r)$.

p. 80: partial derivatives w.r. to I:

$$\begin{aligned}\delta A &= \int_0^q [\, p(q', I+\delta I) - p(q', I)\,]\, dq' \\ &= \delta I \int_0^q \frac{\partial}{\partial I}\, p(q', I)\, dq' + O(\delta I^2)\,.\end{aligned}$$

$$\phi(q, I) = \int_0^q \frac{\partial}{\partial I}\, p(q', I)\, dq'\,. \tag{2.116}$$

p. 87: line 2 after Eq. (2.148): ... (see Problem 2.2).

p. 88: replace π by $\hbar$:

$$(k^2R^2 - l^2)^{1/2} - l\cos^{-1}\left(\frac{l}{kR}\right) = \left(n_r + \frac{\mu}{4} + \frac{b}{2}\right)\hbar\,, \quad n_r = 0, 1, 2, \ldots \tag{2.153}$$

p. 88: replace π by $\hbar$:

$$(k^2R^2 - l^2)^{1/2} - l\cos^{-1}\left(\frac{l}{kR}\right) = \left(n_r + \frac{3}{4}\right)\hbar\,, \quad n_r = 0, 1, 2, \ldots \tag{2.154}$$

p. 88: line 1 after Eq. (2.155): where x_{ln} is the n-th zero of $J_l(x)$. [Unlike in the ...]

p. 91: remove second factor i in second exponent:

$$\begin{aligned}\delta g^{(2)}(E) = \frac{1}{2\pi\hbar^2} \sum_{M_1,M_2}{}' \exp\left(-i\,\mathbf{M}\cdot\boldsymbol{\mu}\,\frac{\pi}{2}\right) \qquad (2.163)\\ \times \frac{1}{\hbar}\int_{-\infty}^{\infty} d\tau \int_{\hbar\frac{\mu_1}{4}}^{\infty} dI_1 \int_{\hbar\frac{\mu_2}{4}}^{\infty} dI_2\, \exp\left\{\frac{i}{\hbar}\left[2\pi\mathbf{M}\cdot\mathbf{I} + \tau(E - H(I_1, I_2))\right]\right\},\end{aligned}$$

p. 94: correct exponents:

$$g^{(2)}(E) = \frac{1}{2\pi\hbar^2} \sum_{M_1,M_2=-\infty}^{\infty} \frac{1}{\hbar}\int_{-\infty}^{\infty} d\tau \int_0^{\infty} dI_1 \int_0^{\infty} dI_2\, \exp[i\Phi_{\mathbf{M}}(I_1, I_2, \tau)]\,. \tag{2.175}$$

p. 96: remove factor $1/2$ in front of the second sum:

$$\begin{aligned}g\,(E) = \frac{ma_1a_2}{2\pi\hbar^2} \sum_{M_1,M_2=-\infty}^{\infty} J_0\left(\frac{S_{M_1M_2}}{\hbar}\right)\\ - \sum_{i=1,2} \frac{a_i}{4\pi\hbar}\sqrt{\frac{2m}{E}} \sum_{M=-\infty}^{\infty} \cos\left(2Ma_i\sqrt{2mE}/\hbar\right)\,. \qquad (E > 0) \qquad (2.187)\end{aligned}$$

p. 99: line 2: in Fig. 2.11

p. 101: line 3 after Eq. (2.202): in Eq. (2.197)

p. 107: In Problem (2.2.a):

$$a = \frac{1}{2}(r_1 + r_2) = -\frac{k}{2E}\,, \qquad b = \sqrt{r_1 r_2} = \sqrt{-\frac{L_z^2}{2mE}}\,,$$

where b is the semi-minor axis and $V(r) = -k/r$.

p. 109:

[18] S. C. Creagh and N. D. Whelan, Phys. Rev. Lett. **77**, 4975 (1996).

[22] ... J. Phys. **6** → J. Phys. **A 6**

p. 114: In Eq. (3.22), left side is: $C(\mathbf{r}, \mathbf{r}'; \beta)$.

p. 115: add factor $\delta(t - t')$ on r.h.s.:

$$\left(-i\hbar\frac{\partial}{\partial t} + \hat{H}_{\mathbf{r}}\right) K(\mathbf{r}, \mathbf{r}'; t - t') = -i\hbar\,\delta(\mathbf{r} - \mathbf{r}')\,\delta(t - t')\,. \tag{3.26}$$

p. 116: line 2 after (3.34): *resolvent*

p. 120: line 5 after Eq. (3.54): to and exact → to an exact

p. 124: lines 5 and 6 after Eq. (3.73): $m \to p$

p. 127: line after Eq. (3.87): where $S_M^{(1)}(a_i) = 2Ma_i\sqrt{2mE}$,

p. 131: line 5 after Eq. (3.102): $1/6 \to 1/3$

p. 138: line 7 after Eq. (3.130): Problem 5.3 → Problem 6.2

p. 139: line before Eq. (3.134):
(a) Show that the classical equations of motion in r-space are independent of ϕ:

p. 140: invert argument of root:

$$g(E) = \frac{1}{2}\frac{E_{at}^{3/2}}{(-E)^{5/2}}\left\{1 + 2\sum_{k=1}^{\infty}\cos\left(2\pi k\sqrt{-E_{at}/E}\right)\right\}. \qquad E < 0 \tag{3.144}$$

p. 148:

$$\begin{aligned} f_{cl}(x_1, x_2, \ldots, x_D; p_1, p_2, \ldots, p_D; \beta) \;&=\; \frac{1}{h^D}\exp\left[-\beta\,(p_1^2 + p_2^2 + \ldots + p_D^2)/2m\right] \\ &\quad\times \exp\left[-\beta\,V(x_1, x_2, \ldots, x_D)\right]\,. \end{aligned} \tag{4.15}$$

pp. 151 - 155 and pp. 170, 171: in Eqs. (4.32), (4.33), (4.39), (4.42), (4.44), (4.47), (4.48), the equation at the bottom of p. 154, and in Eqs. (4.54), (4.55), (4.58), (4.88) - (4.90), replace:

$$d^3r \to d^D r, \quad d^3p \to d^D p, \quad d\mathbf{p} \to d^D p.$$

pp. 154,155: remove prefactor $\frac{1}{\beta}$ in Eqs. (4.52), (4.54) and (4.55).

p. 156: correct prefactor of integral:

$$g_{ETF}(E) = g_{TF}(E) - \frac{1}{96\pi^2}\left(\frac{2m}{\hbar^2}\right)^{1/2} \frac{\partial}{\partial E}\int d^3r\, \Theta\left(E - V(\mathbf{r})\right) \frac{\nabla^2 V}{(E-V)^{1/2}} \,. \quad (D=3) \tag{4.61}$$

p. 156: correct coefficient of $\nabla^2 V$ term:

$$\begin{aligned}\tau_{ETF}(\mathbf{r}) = & \frac{1}{4\pi}\frac{2m}{\hbar^2}\left(\mu - V(\mathbf{r})\right)^2 \\ & - \frac{1}{6\pi}\nabla^2 V\,\Theta(\mu - V(\mathbf{r})) + \frac{1}{6\pi}(\nabla V)^2\,\delta(\mu - V(\mathbf{r}))\,,\end{aligned} \tag{4.64}$$

p. 158: correct powers of $(\mu - V(\mathbf{r}))$ in second line of Eq. (4.72):

$$\left\{1 - \frac{5}{24}\frac{\hbar^2}{2m}\left[\frac{\nabla^2 V}{(\mu - V(\mathbf{r}))^2} + \frac{(\nabla V)^2}{4(\mu - V(\mathbf{r}))^3}\right] + \mathcal{O}(\hbar^4)\right\}.$$

p. 159: correct second term:

$$\tau_{ETF}[\rho] = \frac{\hbar^2}{2m}\left[\pi\,\rho^2 + \frac{1}{3}\nabla^2\rho\right]. \qquad (D=2) \tag{4.76}$$

p. 163: in Eq. (4.80), replace $\lambda \to \mu$.

p. 164: line 15: More generally, the highest derivative term in $\tau_{2n}[\rho]$ goes radially like

$$\tau_{2n}[\rho(r)] \sim \rho^{(5-2n)/3}(r)\left(\frac{1}{\rho}\frac{d^{2n}\rho(r)}{dr^{2n}}\right), \tag{4.83}$$

p. 170: replace energy E by Fermi energy μ:

$$N = \frac{2}{h^D}\int d^D p \int d^D r\, \Theta\left(\mu - H_{cl}(\mathbf{p},\mathbf{r})\right)\,, \tag{4.88}$$

p. 172: change sign in exponent:

$$\nu_n = \frac{1}{1+\exp\left(\frac{E_n-\mu}{T}\right)}, \qquad N = \langle \hat{N}\rangle = 2\sum_n \nu_n\,. \tag{4.94}$$

p. 173: remove factor μ in last term:

$$\rho(\mathbf{r}) = \mathcal{L}_\mu^{-1}\left[\frac{1}{\beta}C_T(\mathbf{r},\beta)\right], \qquad \mathcal{F}(\mathbf{r}) = \mu\rho(\mathbf{r}) - \mathcal{L}_\mu^{-1}\left[\frac{1}{\beta^2}C_T(\mathbf{r},\beta)\right]. \tag{4.108}$$

p. 181: bottom line: ... one has $\mathcal{A} = \pi R^2$ and ...

p. 186: lines 1 and 2 after (4.155): $i \to n$

p. 186: line 11 after (4.155): ... leads to characteristic energy gaps ...

p. 201: Problem 4.6(b): ..., use the folding theorem for two-sided Laplace transforms [67] (see also Appendix B) to show that

$$\mathcal{L}_E^{-1}\left[\frac{1}{\beta^2}\frac{\pi T}{\sin(\pi\beta T)}\right] = \int_0^{+\infty}\frac{E'}{\left[1+\exp\left(\frac{E'-E}{T}\right)\right]}\,dE' = T^2 F_1\left(\frac{E}{T}\right), \tag{4.207}$$

p. 201: correct index in last term to -3:

$$g_{ETF}(E) = \frac{1}{\hbar\omega}\left\{\left(\frac{T}{\hbar\omega}\right)^2 F_1\left(\frac{E}{T}\right) - \frac{1}{8}\widetilde{F}_{-1}\left(\frac{E}{T}\right) + \frac{17}{1920}\left(\frac{\hbar\omega}{T}\right)^2\widetilde{F}_{-3}\left(\frac{E}{T}\right) + \dots\right\}. \tag{4.208}$$

p. 202: [10] N. H. March: ...

p. 202: In the equations (4.213) and (4.214), add: " + ..." to indicate that higher-order terms in $\hbar$ are missing, like in Eq. (4.208) (see correction above).

p. 205:

[75] M. Onsi, H. Przysiezniak, and J. M. Pearson, Phys. Rev. **C 55**, 3139 (1997).

[96] J. I. Kapusta, ...

p. 208: line 5: it will ...

p. 211: line 4 after Eq. (5.9): determinant of C $\to$ determinant of C^{-1}

p. 215: correct summation index:

$$S(\mathbf{r},\mathbf{r}';E) = S_{po}(E) + \frac{1}{2}\sum_{i,j=1}^{D-1} W_{ij}(q)\, r_{\perp i} r_{\perp j}\,, \tag{5.26}$$

p. 216: change sign in first exponent and replace $D \to \mathcal{D}$ under integral:

$$\delta\,\mathrm{tr}\,G_{scl}(E) \quad\propto\quad e^{i[S_{po}/\hbar-(\mu+\nu)\pi/2]}\int |\mathcal{D}(q)|^{1/2}\,|\mathrm{det}W(q)|^{-1/2}\,dq \tag{5.29}$$

p. 216: add exponent 1/2 on last term:

$$|\mathcal{D}(q)|^{-1/2}\,|\mathrm{det}W(q)|^{1/2} = |\dot{q}|\left|\frac{\partial(\mathbf{r}_\perp - \mathbf{r}'_\perp, \mathbf{p}_\perp - \mathbf{p}'_\perp)}{\partial(\mathbf{r}'_\perp, \mathbf{p}'_\perp)}\right|_0^{1/2}. \tag{5.32}$$

p. 217: first line after Eq. (5.33): Remember that ...

p. 220: lines 16-12 from bottom: [...in increasing direction.)] Both the old and the new orbits are typically isolated; their stability depends on the type of bifurcation. In integrable systems, new families of degenerate orbits may also be born. At the bifurcation point, the old and new orbits are degenerate, and in a finite interval around the bifurcation point they cannot be described by the trace formula (5.36). [For a general discussion ...]

p. 223: lines 4 and 22: $\delta g_{scl}(E)$

p. 224: correct:

$$\Delta E_n \;\lessapprox\; \gamma \;\ll\; \hbar\Omega \simeq 2\pi\hbar/T_{ppo}^{min}\,, \tag{5.47}$$

p. 225: add factor k_B in denominator:

$$\int_{-\infty}^{\infty} \frac{1}{4k_BT\mathrm{Cosh}^2[(E'-E)/2k_BT]}\mathcal{A}_{po}(E')\, e^{i\left[\frac{1}{\hbar}S_{po}(E')+\phi\right]}\, dE'. \tag{5.53}$$

p. 225: change sign:

$$\delta N_{scl}(E) = -\Re e \sum_{po}\left(\frac{\hbar}{T_{po}}\right)\mathcal{A}_{po}(E)\, e^{i\left[\frac{1}{\hbar}S_{po}(E)+\phi\right]}. \tag{5.55}$$

p. 232: line 2 after Eq. (5.73):
$\phi = \pi/2$ and $\phi = \pm\pi/6$, and of rotations about the angles $\pm 2\pi/3$. The potential ...

p. 232: line 4 after Eq. (5.73): $E^* = (m\omega^2)^3/6\alpha^2$.

p. 232: line 4 before Eq. (5.76):
with $\phi = \pi/2$ (v-axis) and $\phi = \pm\pi/6$, the potential is ...

p. 240: line before Eq. (5.88):
two isolated diameter orbits are, for small deformations ϵ and repetition numbers n,

pp. 240 - 242:

[10] J. H. Van Vleck, ...

[16] C. G. Gray, G. Karl, and V. A. Novikov, Ann. Phys. (N. Y.) **251**, 1 (1997).

[23] M. Sieber, J. Phys. **A 30**, 4563 (1997).

[36] N. D. Whelan, J. Phys. **A 30**, 533 (1997).

[43] T. Szeredi and ...

[44] J. M. Rost and G. Tanner, in *Classical, Semiclassical and Quantum Dynamics in Atoms*, eds. H. Friedrich and B. Eckhardt (Lecture Notes in Physics 485, Springer, Berlin, 1997), p. 274.

[48] R. K. Bhaduri, Avinash Khare, S. M. Reimann, and E. L. Tomusiak, Ann. Phys. (N. Y.) **254**, 25 (1997).

p. 246: from line 3 after Eq. (6.4) replace text by:
[...periodic orbit.] The Jacobian (6.4) becomes zero at caustic points; for a specific orbit these are, however, only isolated points which have a zero measure in the integral over x and y so that the trace in Eq. (6.3) is well defined. The phase changes occurring at the caustic and reflection points [are contained ...]

p. 252: line before Eq. (6.11): term in (6.10) and ...

p. 257: correct numerator in the middle:

$$\mathcal{J}_{vw} = \left(\frac{\partial r_\perp}{\partial p'_\perp}\right)_{vw} = \frac{2v(r^2 - R^2\cos^2\varphi_{vw})}{pR\sin\varphi_{vw}} \tag{6.13}$$

p. 257: lines 3,4 of second paragraph: ... the second repetition (4.2) of the diameter and the (5,2) star orbit ...

p. 276: top line:
..., one gets the following contributions (valid for small enough ϵ for a given n):

p. 280: insert denominator $n\epsilon$ under summation:

$$\delta g_{diam}(E) \simeq \left(\frac{mR}{\hbar\pi p}\right)\Im m \sum_{n=1}^{n_{max}} \frac{1}{n\epsilon} e^{i\,(4nkR-3n\pi+3\pi/4)} \left[e^{i\,\epsilon^2 nkR - i\,\pi/4} + e^{-i\,\epsilon^2 nkR + i\,\pi/4}\right]. \tag{6.58}$$

p. 290: in lines 4 and 5 of second paragraph, omit: "using the lowest harmonics (n=1) only,"

p. 295 - 296:

[11] A. G. Magner, S. N. Fedotkin, F. A. Ivanyuk, P. Meier, M. Brack, S. M. Reimann, and H. Koizumi, Ann. Physik (Leipzig) **6**, 555 (1997).

[28] ..., Phys. Rev. **E 54**, 136 (1996).

[30] M. Sieber, J. Phys. **A 30**, 4563 (1997).

[31] P. Meier, M. Brack, and S. C. Creagh, Z. Phys. **D 41**, 281 (1997).

[32] M. Brack, J. Blaschke, S. C. Creagh, A. G. Magner, P. Meier, and S. M. Reimann, Z. Phys. **D 40**, 276 (1997).

[37] M. Brack, S. C. Creagh, and J. Law, Phys. Rev. **A 57**, 788 (1998); see M. Brack, P. Meier, and K. Tanaka, J. Phys. **A 32**, 331 (1999), for a more recent analytical uniform approximation.

[42] P. Bøggild, A. Kristensen, P. E. Lindelof, S. M. Reimann, and C. B. Sørensen, in: *23rd International Conference on the Physics of Semiconductors (ICPS), Berlin 1996* (World Scientific, Singapore, 1997), p. 1533.

p. 300: correct denominator and following line:

$$\delta(t-t_n) = \lim_{\gamma\to 0}\left(\frac{\gamma}{\pi}\right)\frac{1}{\gamma^2+(t-t_n)^2}\,, \tag{7.12}$$

we see from Eqs. (7.7) and (7.11) that

p. 300: correct denominator and following sentence:

$$g_\sigma(t) \;=\; \frac{1}{\pi}\sum_n \frac{(\sigma-1/2)}{(\sigma-1/2)^2+(t-t_n)^2}\,. \tag{7.14}$$

We are now in a position to obtain an analogous relation for the phase angle of the zeta function ...

p. 306: correct exponent on r.h.s. and following line:

$$\sum_{n^\star+1}^{\infty}\frac{1}{\sqrt{n}}\exp\left(-it\ln n\right) = \sum_{m=-\infty}^{\infty}\int_{n^\star}^{\infty}\frac{1}{\sqrt{x}}\exp\left[-i\mathcal{S}(x)+2\pi imx\right]dx\,, \tag{7.29}$$

where we have neglected 1/2 in comparison to $n^\star$, and $\mathcal{S}(n)=\mathcal{S}_n$ is defined by ...

p. 308: Sect. 7.2.1, line 6: ...the Gutzwiller formula (5.38) is exact.

p. 309: correct denominator on l.h.s. and argument to x:

$$\frac{1}{2\,\mathrm{Sinh}(x/2)} = \sum_{n=0}^{\infty}\exp\left[-\left(n+\frac{1}{2}\right)x\right], \tag{7.44}$$

p. 311: correct brackets:

$$\xi(E) \;=\; \Re e\left\{\exp\left[-i\pi\,\widetilde{N}(E)\right]\zeta_s(E)\right\} = 0\,. \tag{7.51}$$

p. 312: in legend along y axis of Fig. 7.6: replace $\xi(E)$ by $\zeta(E)$

p. 313: replace the first sentence on line 1 by:
Here R is a positive constant with the dimension of a length. [All classical ...]

p. 313: line 14: poles $\to$ zeros

p. 321: in the sentence before Eq. (7.79), replace: (3.29) $\to$ (3.30)

p. 322: in the middle of line 2 after Eq. (7.82), insert the sentence:
Note that if the point $\mathbf{r}$ is on the boundary ($\mathbf{r} \in B$), the r.h.s. of Eq. (7.82) must be multiplied by a factor 1/2. [The equation above ...]

p. 322: add boundary condition:

$$\Psi_E(\mathbf{r}) = -\frac{\hbar^2}{2m}\oint_B G_0(\mathbf{r},\mathbf{r}';E)\,\mu(\mathbf{r}')\,d\mathbf{r}'\,, \qquad (\mathbf{r} \notin B) \tag{7.83}$$

p. 322: add boundary condition:

$$\nabla_{\mathbf{r}}\Psi_E(\mathbf{r}) = -\frac{\hbar^2}{2m}\oint_B \nabla_{\mathbf{r}}G_0(\mathbf{r},\mathbf{r}';E)\,\mu(\mathbf{r}')\,d\mathbf{r}'\,. \qquad (\mathbf{r} \notin B) \tag{7.85}$$

p. 322: remove factor 1/2, add boundary condition:

$$\mu(\mathbf{r}) = -\frac{\hbar^2}{m}\oint_B \left[\nabla_{\mathbf{r}}G_0(\mathbf{r},\mathbf{r}';E)\cdot\mathbf{n}\right]\,\mu(\mathbf{r}')\,d\mathbf{r}'\,. \qquad (\mathbf{r} \in B) \tag{7.86}$$

p. 342: line before Eq. (7.156): (assuming $|\mathbf{r}-\xi| \simeq r$ and $r \gg a$)

p. 343: line 3 from bottom: $\xi - 2 \;\to\; \xi_2$

p. 360 - 362:

[3] R. K. Bhaduri, Avinash Khare, S. M. Reimann, and E. L. Tomusiak, Ann. Phys. (N. Y.) **254**, 25 (1997).

[10] S. W. McDonald, ...

[50] N. C. Snaith and D. A. Goodings, Phys. Rev **E 55**, 5212 (1997).

[53] N. D. Whelan, Phys. Rev. Lett. **76**, 2605 (1996).

p. 370: first line after Eq. (8.9): $A = 1/c^3 - B/5$

p. 376: line after Eq. (8.13):
where Dirichlet boundary conditions have been assumed and $\hbar^2/2m = 1$.

p. 380: 3rd line from bottom: $\rho_e = k_F^3/(3\pi^2)$.

p. 382: for consistency with Ref. [65], correct:

$$I_N \sim \exp[-\Delta_1 F(N-1)/k_B T]\,, \tag{8.15}$$

p. 383: top line: $\Delta_1 F(N) = F(N+1) - F(N)$

p. 393: in caption to Figure 8.16: [79] $\to$ [78]

p. 398 - 400:

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p. 405: rearrange r.h. bracket

$$\hat{H} = \sum_{i=1}^{N} \left\{ \frac{\mathbf{p}_i^2}{2m} + U(\mathbf{r}_i) \right\} + \frac{1}{2} \sum_{i,j(\neq i)=1}^{N} V^{(2)}(\mathbf{r}_i, \mathbf{r}_j)\,. \tag{A.1}$$

p. 405: insert factor N for correct normalisation:

$$\rho_1(\mathbf{r},\mathbf{r}') = N\int d^3r_2 \int d^3r_3 \ldots \int d^3r_N\, \Psi^*(\mathbf{r}',\mathbf{r}_2,...,\mathbf{r}_N)\,\Psi(\mathbf{r},\mathbf{r}_2,...,\mathbf{r}_N)\,. \tag{A.2}$$

p. 406: add normalization factor on r.h.s.:

$$\Phi(\mathbf{r}_1,\mathbf{r}_2,\ldots,\mathbf{r}_N) = \frac{1}{\sqrt{N!}}\,\det|\psi_i(\mathbf{r}_j)|_{i,j=1,2,\ldots,N}\,. \tag{A.5}$$

p. 407: add d^3r :

$$E_{HF} = \int \left\{\tau(\mathbf{r}) + U(\mathbf{r})\rho(\mathbf{r}) + \frac{1}{2}V_H(\mathbf{r})\rho(\mathbf{r})\right\} d^3r \;+\; E_x\,, \tag{A.13}$$

p. 415: third line of Eq. (B.3): omit the restriction ($\mu > -1$).

p. 415: at the end of the bottom line, add:
[... are $-\infty$], and the upper limit in Eq. (B.1) is $+\infty$.

p. 419: correct first summation index:

$$H = \frac{1}{2m}\sum_i p_i^2 + \frac{1}{2}\sum_{ij} V_{ij}(t)q_iq_j\,, \qquad (i,j=1,2,...,D) \tag{C.17}$$

p. 419: line before (C.18): replace $2n \to 2D$

p. 419: move the factor $1/m$:

$$\frac{d}{dt}\begin{pmatrix}\mathbf{q}\\ \mathbf{p}\end{pmatrix} = \begin{pmatrix}\mathbf{0} & \frac{1}{m}\mathbf{1}\\ -\mathbf{V} & \mathbf{0}\end{pmatrix}\begin{pmatrix}\mathbf{q}\\ \mathbf{p}\end{pmatrix}, \tag{C.18}$$

where $\mathbf{V}$ is the coefficient matrix V_{ij} of the potential energy in (C.17), and $\mathbf{0}$ is a $D\times D$ matrix of zeros. We then have ...

p. 420: line before Eq. (C.23): ... of the stability matrices for $n=1$ are

p. 420: last line of third paragraph: This is demonstrated in Sect. 5.6.2.

p. 420: second line after (C.26): replace $2n \to 2D$

p. 426: correct power:

$$R(\varphi) = \frac{1}{AB}\left[B^2\cos^2\varphi + A^2\sin^2\varphi\right]^{3/2}. \tag{C.57}$$

back cover: The correct location of the European Centre for Theoretical Studies in Nuclear Physics and Related Areas is *Trento*, not *Trieste*.