List of corrections

first uploaded on June 2, 2011
updated on August 31, 2011

- p 7 line 1

  error: ..., a system in equilibrium has a certain pressure and

  correction: ..., a system in equilibrium has a certain volume and

- p 11 eq.(1.9) line 5

  error: $= N(N-1)p^2 + NP - N^2p^2$

  correction: $= N(N-1)p^2 + Np - N^2p^2$

- p 14 line above eq.(1.16)

  error: Furthermore,

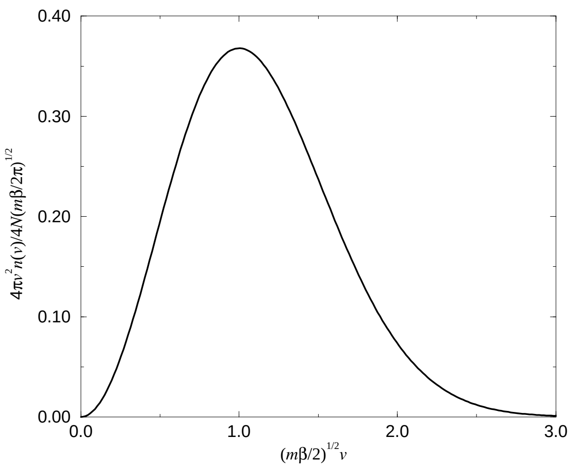
  correction: Furthermore, at $n = Np$,

- p 18 Fig. 1.4

  error: the legend in the horizontal axis, $(2/m\beta)^{1/2}v$, is incorrect, and that in the vertical axis, $4\pi v^2 n(v)/N(m\beta/2\pi)^{1/2}$, is incorrect.

  correction: the legend in the horizontal axis should be $(m\beta/2)^{1/2}v$ and that in the vertical axis should be $4\pi v^2 n(v)/4N(m\beta/2\pi)^{1/2}$

  correct figure:



- p 18 Fig. 1.4 caption

  error: ...To make the figure demensionless, $4\pi v^2 n(v)$ divided by $N\sqrt{m\beta/2\pi}$ has been plotted as a function of $\sqrt{2/m\beta}\,v$.

  correction: ...To make the figure demensionless, $4\pi v^2 n(v)$ divided by $4N\sqrt{m\beta/2\pi}$ has been plotted as a function of $\sqrt{m\beta/2}\,v$.

- p 29 eq.(2.16)

  error:

$$0 = \frac{\mathrm{d}}{\mathrm{d}E_\mathrm{I}} k_\mathrm{B} \ln[\Omega_\mathrm{I}(E_\mathrm{I})\Omega_\mathrm{II}(E - E_\mathrm{I}] = \frac{\mathrm{d}}{\mathrm{d}E_\mathrm{I}}[S_\mathrm{I}(E_\mathrm{I}) + S_\mathrm{II}(E - E_\mathrm{I})]$$
$$= \frac{\partial S_\mathrm{I}(E_\mathrm{I})}{\partial E_\mathrm{I}} - \frac{\partial S_\mathrm{II}(E - E_\mathrm{I})}{\partial E} . \qquad (2.16)$$

  correction:

$$0 = \frac{\mathrm{d}}{\mathrm{d}E_\mathrm{I}} k_\mathrm{B} \ln[\Omega_\mathrm{I}(E_\mathrm{I})\Omega_\mathrm{II}(E - E_\mathrm{I})] = \frac{\mathrm{d}}{\mathrm{d}E_\mathrm{I}}[S_\mathrm{I}(E_\mathrm{I}) + S_\mathrm{II}(E - E_\mathrm{I})]$$
$$= \frac{\partial S_\mathrm{I}(E_\mathrm{I})}{\partial E_\mathrm{I}} - \frac{\partial S_\mathrm{II}(E - E_\mathrm{I})}{\partial E} . \qquad (2.16)$$

- p 40 line 1

  error: The integrand is the probability that energy of the heat bath, of temperature T, is E.

  correction: The integrand is the probability that the system has energy E, in the heat bath of temperature T.

- p 41 line 20

  error: ...This is because the partition function is a maximum for that value of X, which means that the number of microscopic states is at its largest, and so one of them is almost always realized owing to the principle of equal probability.

  correction: ...This is because the constrained partition function takes a maximum for that value of X, which means that the probability for that X to be realized is the highest.

- p 52 line 7

  error: dimensional space of le ngth L_x. ...

  correction: dimensional space of length L_x. ...

- p 59 line 4

  error: ..., where $0 \le j \le \infty$ and $0 \le i \le N$.

  correction: ..., where $1 \le j < \infty$ and $1 \le i \le N$.

- p 60 eq.(4.36) second line

  error:

$$= \sum_j \exp\left[-\beta E_1^{(\mathrm{CG})}(j)\right] \sum_k \exp\left[-\beta E_1^{(\mathrm{V})}(k)\right] \sum_j \exp\left[-\beta E_1^{(\mathrm{R})}(l)\right]$$

  correction:

$$= \sum_j \exp\left[-\beta E_1^{(\mathrm{CG})}(j)\right] \sum_k \exp\left[-\beta E_1^{(\mathrm{V})}(k)\right] \sum_l \exp\left[-\beta E_1^{(\mathrm{R})}(l)\right]$$

- p 60 eq.(4.40)

  error:

$$F^{(\mathrm{CG})} = -k_{\mathrm{B}}TN\ln Z^{(\mathrm{CG})} = -\frac{3}{2}k_{\mathrm{B}}TN\ln\left(2\pi Mk_{\mathrm{B}}T\right)\ , \tag{4.40}$$

  correction:

$$\begin{aligned} F^{(\mathrm{CG})} &= -k_{\mathrm{B}}TN\ln Z^{(\mathrm{CG})} \\ &= -\frac{3}{2}k_{\mathrm{B}}TN\ln\left(2\pi Mk_{\mathrm{B}}T\right) - k_{\mathrm{B}}TN\ln\left(\frac{V}{h^3}\right)\ , \end{aligned} \tag{4.40}$$

- p 72 eq.(5.15)

  three $\omega_\alpha(k)$s in this equation should be read as $\omega_\alpha(\boldsymbol{k})$

- p 73 eq.(5.16), eq.(5.17), and three lines above eq.(5.17)

  eight $\omega_\alpha(k)$s in these equations should be read as $\omega_\alpha(\boldsymbol{k})$

- p 80 eq.(5.27)

  error:

$$\lambda_m = \frac{hc}{4.97k_{\mathrm{B}}T} = \frac{2.90\times10^{-3}}{T}\,\mathrm{m\,K^{-1}}\,. \tag{5.27}$$

  correction:

$$\lambda_m = \frac{hc}{4.97k_{\mathrm{B}}T} = \frac{2.90\times10^{-3}}{T}\,\mathrm{m\,K}\,. \tag{5.27}$$

- p 99 eq.(7.28)

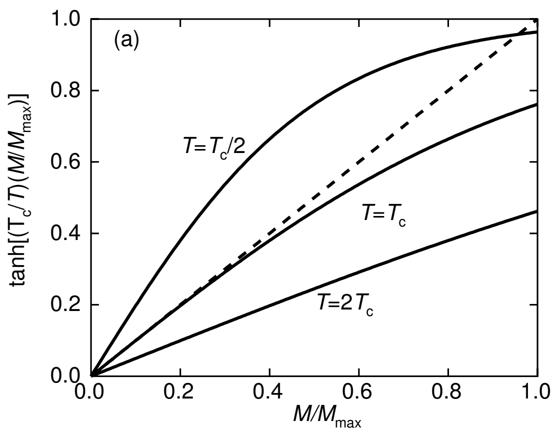
  error:

$$\langle N_{+-}\rangle = \langle N_{-+}\rangle = \frac{1}{2}zN\left(\frac{N_+}{N}\right)\left(\frac{N_-}{N}\right) = \frac{z}{8}\left(1-x^2\right)\ , \tag{7.28}$$

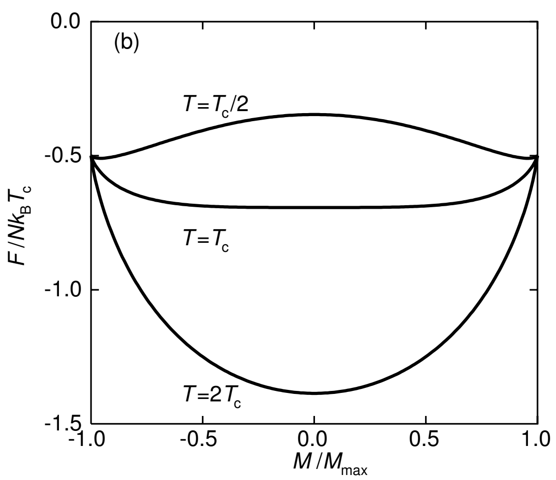
  correction:

$$\langle N_{+-}\rangle = \langle N_{-+}\rangle = \frac{1}{2}zN\left(\frac{N_+}{N}\right)\left(\frac{N_-}{N}\right) = \frac{z}{8}N\left(1-x^2\right)\ , \tag{7.28}$$

- p 101 Fig.7.6(a)
  error: the legend in the vertical axis, $\tan[T_c/T)(M/M_{max})]$ is incorrect
  correction: legend should be $\tanh[(T_c/T)(M/M_{max})]$
  correct figure:



- p 101 Fig.7.6(b)
  error: the legend in the vertical axis, F/Nk_BT is incorrect
  correction: legend should be F/Nk_BT_c
  correct figure:



- p 105 eq.(7.44)

$$\chi(T) = \frac{\dfrac{\mu\mu_0 M_{\rm max}}{k_{\rm B}T}\,{\rm sech}^2\left(\dfrac{\mu B_{\rm eff}}{k_{\rm B}T}\right)}{1 - \dfrac{zJ}{k_{\rm B}T}\,{\rm sech}^2\left(\dfrac{\mu B_{\rm eff}}{k_{\rm B}T}\right)}\,. \tag{7.44}$$

- p 143 line 2 below eq.(9.36)

  error: At $T_{\rm c}$, $\kappa_1 = 1$ and ...

  correction: At $T_{\rm c}$, $\kappa_1 = 0$ and ...

- p 143 eq.(9.37)

  error:

$$C \simeq -\frac{2}{\pi} N k_{\rm B} \left(\frac{J}{k_{\rm B}T_{\rm c}}\right)^2 \ln|T - T_{\rm c}|\,. \tag{7.45}$$

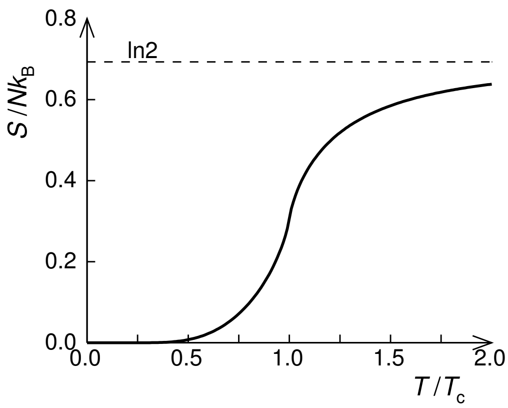
  correction:

$$C \simeq -\frac{8}{\pi} N k_{\rm B} \left(\frac{J}{k_{\rm B}T_{\rm c}}\right)^2 \ln|T - T_{\rm c}|\,. \tag{7.37}$$

- p 144 Fig.9.6

  error: the figure is not correct.

  correction: correct fiugure is



- p 149 line 9

  error: ..., which we consedered in Chap. 1. and ...

  correction: ..., which we consedered in Chap. 2. and ...

- p 151 line 9

  error: considered above a method ...

  correction: considered in Sect. 10.1 a method ...

- p 152 line 1

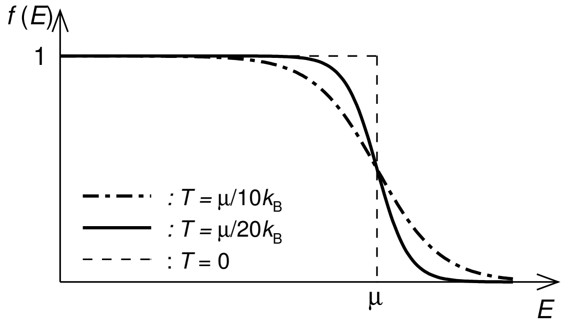
  error: For a state with an energy $E_i \ll \mu - k_{\rm B}T$, ...

  correction: For a state with an energy $E_i \ll \mu + k_{\rm B}T$, ...

- p 152 Fig.10.1

  error: the figure is not traced correctly.

  correction: correct fiugure is



- p 154 eq.(10.25)

  error:

$$S = -k_{\mathrm{B}} \sum_i \left[\langle n_i \rangle \ln \langle n_i \rangle + (1 \mp \langle n_i \rangle) \ln (1 \mp \langle n_i \rangle) \right] . \tag{10.25}$$

  correction:

$$S = -k_{\mathrm{B}} \sum_i \left[\langle n_i \rangle \ln \langle n_i \rangle \pm (1 \mp \langle n_i \rangle) \ln (1 \mp \langle n_i \rangle) \right] . \tag{10.25}$$

- p 155 line above eq.(10.29)

  error: states. Using $\mathrm{d}E/\mathrm{d}p = p/2m$ and ...

  correction: states. Using $\mathrm{d}E/\mathrm{d}p = p/m$ and ...

- p 156 eq.(10.33)

  error:

$$= \sum_{s=\pm\frac{1}{2}} \int_{g\mu_{\mathrm{B}}sB}^{\infty} \mathrm{d}E D(E - g\mu_{\mathrm{B}}sB) \frac{E - g\mu_{\mathrm{B}}s}{\mathrm{e}^{\beta(E-\mu)} + 1} . \tag{10.33}$$

  correction:

$$= \sum_{s=\pm\frac{1}{2}} \int_{g\mu_{\mathrm{B}}sB}^{\infty} \mathrm{d}E D(E - g\mu_{\mathrm{B}}sB) \frac{E - g\mu_{\mathrm{B}}sB}{\mathrm{e}^{\beta(E-\mu)} + 1} . \tag{10.33}$$

- p 157 eq.(10.34)

  error:

$$= \frac{2}{3}\frac{V}{2\pi^2\hbar^3}m\sqrt{2m}\sum_{s=\pm\frac{1}{2}}\int_{g\mu_B sB}^{\infty} dE D(E - g\mu_B sB) \times \frac{E - g\mu_B sB}{e^{\beta(E-\mu)} + 1} = \frac{2}{3}U\,. \quad (10.34)$$

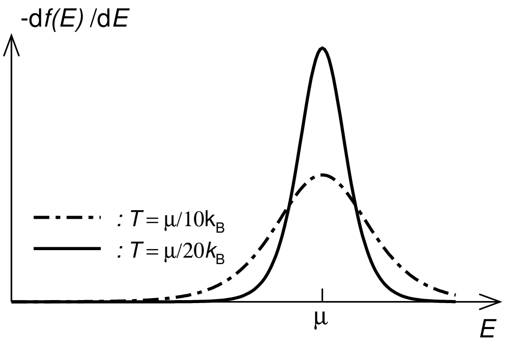
  correction:

$$= \frac{2}{3}\sum_{s=\pm\frac{1}{2}}\int_{g\mu_B sB}^{\infty} dE D(E - g\mu_B sB)\frac{E - g\mu_B sB}{e^{\beta(E-\mu)} + 1} = \frac{2}{3}U\,. \quad (10.34)$$

- p 162 Fig.10.4

  error: the figure is not trace correctly.

  correction: correct fiugure is



- p165 eq.(10.68)

  error:

$$U(T, V, \mu) = \frac{3}{5}N\frac{\mu^{5/2}}{E_F^{3/2}} + \frac{3\pi^2}{8}N\frac{(k_B T)^2\mu^{1/2}}{E_F^{3/2}}\,. \quad (10.68)$$

  correction:

$$U(T, V, \mu) \simeq \frac{3}{5}N\frac{\mu^{5/2}}{E_F^{3/2}} + \frac{3\pi^2}{8}N\frac{(k_B T)^2\mu^{1/2}}{E_F^{3/2}}\,. \quad (10.68)$$

- p 174 unnumbered equation next to eq.(10.91)

  error:
  $$N = N(T_{\rm c}, V, \mu = 0) = \frac{V}{4\pi^2\hbar^3}(2m)^{3/2}(k_{\rm B}T)^{3/2}\,\Gamma\left(\frac{3}{2}\right)\zeta\left(\frac{3}{2}\right)\,,$$

  correction:
  $$N = N(T_{\rm c}, V, \mu = 0) = \frac{V}{4\pi^2\hbar^3}(2m)^{3/2}(k_{\rm B}T_{\rm c})^{3/2}\,\Gamma\left(\frac{3}{2}\right)\zeta\left(\frac{3}{2}\right)\,,$$

- p 175 line above eq.(10.96)

  error: a function $F_\sigma(\alpha)$, where

  correction: a function $F_\sigma(x)$, where

- p176 eq.(10.102)

  error:
  $$F_{3/2}(-\beta\mu) = \zeta\left(\frac{T_{\rm c}}{T}\right)^{3/2}. \tag{10.102}$$

  correction:
  $$F_{3/2}(-\beta\mu) = \zeta\left(\frac{3}{2}\right)\left(\frac{T_{\rm c}}{T}\right)^{3/2}. \tag{10.102}$$

- p 179 eq.(10.109) second line

  error:
  $$\simeq \frac{V}{4\pi^2}(2m)^{3/2}\int_0^\infty {\rm d}E\sqrt{E}\,{\rm e}^{-\beta(E-\mu)}$$

  correction:
  $$\simeq \frac{V}{4\pi^2\hbar^3}(2m)^{3/2}\int_0^\infty {\rm d}E\sqrt{E}\,{\rm e}^{-\beta(E-\mu)}$$

- p 179 eq.(10.111)

  error:

$$
\begin{aligned}
U &= \int_0^\infty \mathrm{d}E D(E) E \langle n(E) \rangle \\
&\simeq \frac{V}{4\pi^2} (2m)^{3/2} \int_0^\infty \mathrm{d}E \, (E)^{3/2} \, \mathrm{e}^{-\beta(E-\mu)} \\
&= \frac{V}{4\pi^2} (2m)^{3/2} \, \mathrm{e}^{-\beta\mu} \Gamma\left(\frac{5}{2}\right) \frac{1}{\beta^{5/2}} \\
&= \frac{3}{2} N k_{\mathrm{B}} T \, . \qquad (10.111)
\end{aligned}
$$

  correction:

$$
\begin{aligned}
U &= \int_0^\infty \mathrm{d}E D(E) E \langle n(E) \rangle \\
&\simeq \frac{V}{4\pi^2 \hbar^3} (2m)^{3/2} \int_0^\infty \mathrm{d}E E^{3/2} \mathrm{e}^{-\beta(E-\mu)} \\
&= \frac{V}{4\pi^2 \hbar^3} (2m)^{3/2} \, \mathrm{e}^{+\beta\mu} \Gamma\left(\frac{5}{2}\right) \frac{1}{\beta^{5/2}} \\
&= \frac{3}{2} N k_{\mathrm{B}} T \, . \qquad (10.111)
\end{aligned}
$$

- p190 eq.(B.17) second line

  error:

$$
= \sqrt{\frac{\pi}{\sigma}} \sum_{n=0}^\infty \frac{(2n-1)!!}{(2n)!} \frac{k^{2n}}{2^n \sigma^2} = \sqrt{\frac{\pi}{\sigma}} \sum_{n=0}^\infty \frac{1}{(n)!} \left(\frac{k^2}{4\sigma}\right)^2
$$

  correction:

$$
= \sqrt{\frac{\pi}{\sigma}} \sum_{n=0}^\infty \frac{(2n-1)!!}{(2n)!} \frac{k^{2n}}{2^n \sigma^n} = \sqrt{\frac{\pi}{\sigma}} \sum_{n=0}^\infty \frac{1}{(n)!} \left(\frac{k^2}{4\sigma}\right)^n
$$

- p 192 line 3

  error: ...at which f has an extremum, ...

  correction: ...at which $f - \lambda g$ has an extremum, ...