Errata in Binney and Tremaine, "Galactic Dynamics"

This list does not include minor or obvious typographical errors, except that all known typos in mathematical formulae are included, no matter how small. The errors are divided into two classes, "Potentially dangerous errors" (mathematically incorrect statements or seriously misleading errors in equations), and "Innocuous errors".

The TeX file of this list is available from the authors at the e-mail addresses below and will be updated if more errors are discovered.

Some of these errors were corrected in printings after March 1994.

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Potentially dangerous errors

p. 45 Contour diagrams in Figure 2-6 are incorrect.

p. 57 Expression for I for prolate spheroid should read

$$\frac{1-e^2}{e}\ln\left(\frac{1+e}{1-e}\right).$$

In the original there is an incorrect square root on top.

p. 102 In the first line of eq. (2P-15), the factor 2π preceding the summation symbol should be replaced by $2G$. Also, eq. (2P-16) should read

$$\alpha_k = \pi\left[\frac{(2k)!}{2^{2k}(k!)^2}\right]^2;$$

the original erroneously used 2^k instead of 2^{2k}.

p. 110 The first line of eq. (3-35) should read

$$\Delta\psi = 2L\int_{s_1}^{s_2}\frac{dI}{r^2} = \frac{2L}{b\sqrt{-2E}}\int_{s_1}^{s_2}\frac{(s-1)ds}{s(s-2)\sqrt{(s_2-s)(s-s_1)}}.$$

p. 140 The sentence following eq. (3-106) is incorrect. It is true that $\Phi_{xx}+\Phi_{yy}+4\Omega_b^2$ is positive, but it does not follow that L_4 and L_5 are always stable. To correct the error, add a period at the end of eq. (3-106) and replace the rest of the paragraph by: Deciding whether condition (3-100b) holds is tedious in the general case, but straightforward in the limit of negligible core radius, $(\Omega_b R_c/v_0)\to 0$ (which applies, for example, to Figure 3-13). Then it is easy to show that (3-100b) holds—and thus that L_4 and L_5 are stable—providing $q^2 > 5[(\frac{32}{25})^{1/2}-1]\simeq(0.81)^2$.

p. 550 Eq. (8P-9) has three misprints: the plus sign in front of A should be a minus; the denominator under A should be 8, not 4, and the exponent of $\tilde r$ beside A should be $-\frac{1}{2}$, not $\frac{1}{2}$. Thus the corrected equation reads

$$x \equiv \frac{r_b}{GM\beta}\simeq \tfrac{1}{2} - \frac{A\tilde r^{-\frac{1}{2}}}{8}\left[\cos\left(\tfrac{1}{2}\sqrt{7}\ln\tilde r+\phi\right)+\sqrt{7}\sin\left(\tfrac{1}{2}\sqrt{7}\ln\tilde r+\phi\right)\right]$$

.

p. 658 In eq. (1C-51), the upper limit of the integral should be π, not ∞.

Innocuous errors

p. 31 First term on right-hand side of eq. (2-7) is missing a superscript and should read $-3/|\mathbf{x}'-\mathbf{x}|^3$.

p. 36 First line after eq. (2-22) should read "From Newton's *first and* second theorems or from equation (2-22) it follows...".
p. 38 Factor G in denominator of eq. (2-35) should be deleted.
p. 44 Sentence three lines above eq. (2-51) should begin "For example, if we take the $(n-1)$st derivative of $\Phi_K(R,z)/a$ with respect to a^2 ...".
p. 55 Second line following eq. (2-81) should finish "...implies $\sinh u_m = \sqrt{(1-e^2)}/e$." In the original the factor e is squared, which is incorrect.
p. 63 Factor $1/R$ in front of first term in eq. (2-108a) should be deleted.
p. 66 In the first line of eq. (2-122), the lower limit on the sum should be $a = r$, not $r = a$.
p. 75 Second last line before eq. (2-155) should read "the surface density $\Sigma_k(R)$ of the sheet...".
p. 78 Last word on the page should be "dotted", not "dashed".
p. 83 Equation (2-188) contains four errors and should read

$$\begin{aligned} N(\alpha,m) &\equiv \int_{-\infty}^{\infty} du'' \int_0^{2\pi} K(u'',\phi'')e^{-i(\alpha u''+m\phi'')}\,d\phi'' \\ &= \pi \frac{[\frac{1}{2}(m-\frac{3}{2}+i\alpha)]![\frac{1}{2}(m-\frac{3}{2}-i\alpha)]!}{[\frac{1}{2}(m-\frac{1}{2}+i\alpha)]![\frac{1}{2}(m-\frac{1}{2}-i\alpha)]!}. \end{aligned} \qquad (2-188)$$

p. 100 Right-hand side of the formula at the end of the second line of the page should read $a^2(\cosh u + |\cos v|)^2$. In the original the factor a was not squared.
p. 101 Lower limit of the integral in eq. (2P-9) should be R, not r.
p. 108 Sentence just after eq. (3-23) should read "...since $r \to \infty$ as $(\psi - \psi_0) \to \arccos(-1/e)$; the orbit..."; in the original the minus sign is missing.
p. 109 Last equality in eq. (3-33) should read

$$= \frac{2\pi b}{\sqrt{-2E}}\left[\tfrac{1}{2}(s_1+s_2)-1\right].$$

p. 138 In the second part of eq. (3-94) there should be a dot over ξ, that is, $\ddot{\eta} = -2\Omega_b\dot{\xi} - \Phi_{yy}\eta$.
p. 139 Last term on the left side of eq. (3-101) should be $16\Omega_b^4$, not $16\Omega_b^2$.
p. 147 Factor R under square root in eq. (3-111) should be replaced by $1/R$.
p. 173 Reference in the caption of Figure 3-27 should be to eq. (3-159), not (3-161).
p. 184 The symbol Ω in eq. (3P-2) should be replaced by Ω^2.
p. 185 In eq. (3P-5) there should be a minus sign before the arctan.
p. 196 First line after eq. (4-22) should read "The last term on the *left* side can be...". Also, in the last line before eq. (4-25), v_j should be replaced by $\overline{v}_j$.
p. 198 Last sentence preceding eq. (4-31) should read "...we may evaluate equation (4-29a) at $z = 0$,...". In the original the equation number is missing.
p. 208 R.h.s. of eq. (4-62): delete the factor R^2 before the integral sign.
p. 214 In eq. (4-83), v_x^2 should be $\overline{v_x^2}$.
p. 220 In eq. (4-100), the factor following the summation should be $(\partial f/\partial I_m)(dI_m/dt)$; in the original the subscript was incorrectly given as n.
p. 225 In eq. (4-113), ψ should be replaced by Ψ; that is, the first equality should read $\rho = c_5\Psi^5$.
p. 272 Twelfth line in third paragraph should read "pump energy from the most *massive* particles...".
p. 300 In the second line following eq. (5-48), the phrase "in square brackets" should be deleted.
p. 381 In last line of the caption to Figure 6-20, replace "merging" by "emerging".
p. 424 Eight and ninth lines should read "by Newton's first *and second* theorems..."
p. 435 First line following eq. (7-41) should read "In any *static* axisymmetric system...".
p. 469 Last line, delete the word "spherical".
p. 487 In eq. (7P-11), the factor ω should be inside the integral sign.
p. 488 In eq. (7P-14) the right bracket after the term A/Ω should be removed.
p. 502 In the first line following eq. (8-42) replace "second line" by "second equality". In the first line after eq. (8-43) replace "equation (4-123a)" by "equation (4-125a)".

p. 534 In eq. (8-106), the first factor inside the square brackets should be $(m_1 + m_a)$, not $(m + m_a)$.

p. 582 The footnote should read "Let the abundance by weight of metals such as Mg, Ca, Si, etc., in the Sun be $\beta \simeq 0.005$ (Allen 1973), and let each Type II supernova eject $\gamma \mathrm{M}_\odot \approx 0.6 \mathrm{M}_\odot$ (Arnett 1978) in these elements. Then $\beta/\gamma \approx 1/120$ supernovae are required to endow each $\mathrm{M}_\odot$ with the solar abundance of metals."

p. 643 The units of the solar mass are g, not cm.

p. 677 In eq. (4A-2a), $\overline{f}(\mathbf{x}, \mathbf{v}, t)$ should be replaced by $\overline{f}(\mathbf{x}, \mathbf{v})$.

p. 690 In eq. (6A-4) the argument of Φ_1 should be $(\mathbf{x}', \mathbf{v}', t')$, that is, a prime should be added to t.