天体と軌道の力学　正誤表　ver 3

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2018年4月28日

第2章

P.27 (2,28)式

[誤]　$r = \dfrac{h^2/\mu}{1 + \sqrt{1 + (2Eh^2/\mu^2) \cos(\theta - \omega)}}$

[正]　$r = \dfrac{h^2/\mu}{1 + \sqrt{1 + (2Eh^2/\mu^2)} \cos(\theta - \omega)}$

P.37 6行目

[誤]　$v = \sqrt{x^{*2} + y^{*2}}$

[正]　$v = \sqrt{\dot{x}^{*2} + \dot{y}^{*2}}$

P.39 (2.93)式

[誤]　$\dfrac{\partial r}{\partial u} \cos f - r \sin f \dfrac{\partial f}{\partial u} = a \cos u$

[正]　$\dfrac{\partial r}{\partial u} \cos f - r \sin f \dfrac{\partial f}{\partial u} = -a \sin u$

P.39 (2.94)式

[誤]　$\dfrac{\partial r}{\partial u} \sin f + r \cos f \dfrac{\partial f}{\partial u} = a\eta \sin u$

[正]　$\dfrac{\partial r}{\partial u} \sin f + r \cos f \dfrac{\partial f}{\partial u} = a\eta \cos u$

P.49 動径rの逆数

[誤]　$\dfrac{a}{r} = \dfrac{1}{1 - e \cos u} = 1 + e \cos u + e^2 \cos 2u + \mathcal{O}(e^3)$

[正]　$\dfrac{a}{r} = \dfrac{1}{1 - e \cos u} = 1 + e \cos u + e^2 \cos^2 u + \mathcal{O}(e^3)$

P.50 (2.203)式

[誤]　$f = l + 2e \sin 2l + \dfrac{5}{4} e^2 \sin 2l + \mathcal{O}(e^2)$

[正]　$f = l + 2e \sin 2l + \dfrac{5}{4} e^2 \sin 2l + \mathcal{O}(e^3)$

P.53 (2.218)式

[誤] $\left\langle \left(\frac{a}{r}\right)^3 \cos f \right\rangle = \frac{1}{2\pi\eta}\int_0^{2\pi}(1+e\cos f)\cos f df = \frac{e}{2\eta^3}$

[正] $\left\langle \left(\frac{a}{r}\right)^3 \cos f \right\rangle = \frac{1}{2\pi\eta^3}\int_0^{2\pi}(1+e\cos f)\cos f df = \frac{e}{2\eta^3}$

P.57 一番下の式

[誤] $x^* + \epsilon_{n+1} = x^* + \epsilon_n - \frac{\epsilon_n f'(x^*) + \frac{\epsilon_n^2}{2} f''(x^*)}{f'(x_n) + \epsilon_n f''(x^*)}$

[正] $x^* + \epsilon_{n+1} = x^* + \epsilon_n - \frac{\epsilon_n f'(x^*) + \frac{\epsilon_n^2}{2} f''(x^*)}{f'(x^*) + \epsilon_n f''(x^*)}$

第3章

P.71 (3.24)式

[誤] $\left\{1 - \left(\frac{a_1}{a_2}\cos\alpha\right)^2\right\} v_A^2 \geq 2(v_1^2 - v_2^2)$

[正] $\left\{1 - \left(\frac{a_1}{a_2}\sin\alpha\right)^2\right\} v_A^2 \geq 2(v_1^2 - v_2^2)$

P.77 (3.42)式

[誤] $\boldsymbol{R} = \frac{\partial}{\partial \boldsymbol{d_2}}\left(\frac{1}{d_1} - \frac{\boldsymbol{d}\cdot\boldsymbol{d_2}}{d^3}\right) \equiv \frac{\partial}{\partial \boldsymbol{d_2}} V$

[正] $\boldsymbol{R} = Gm_1\frac{\partial}{\partial \boldsymbol{d_2}}\left(\frac{1}{d_1} - \frac{\boldsymbol{d}\cdot\boldsymbol{d_2}}{d^3}\right) \equiv \frac{\partial}{\partial \boldsymbol{d_2}} V$

P.77 15行目

[誤] $d << d_2$を満たす。

[正] $d >> d_2$を満たす。

P.77 (3.45)式

[誤] $\frac{1}{d_1} = \sum_{i=0}^{\infty}\left(\frac{d_2}{d}\right)^i P_i(cos\theta)$

[正] $\frac{1}{d_1} = \frac{1}{d}\sum_{i=0}^{\infty}\left(\frac{d_2}{d}\right)^i P_i(cos\theta)$

P.78 (3.48)式

[誤] $\frac{d_2^2}{d_3}P_2(\cos\theta) = \frac{1}{2d^3}\left(2d_2^2\cos^2\theta - d_2^2\right)$

[正] $\frac{d_2^2}{d^3}P_2(\cos\theta) = \frac{1}{2d^3}\left(2d_2^2\cos^2\theta - d_2^2\right)$

P.82 (3.57)式

[誤] $\dfrac{d^2\boldsymbol{d_1}}{dt^2} = -G\left(m_1+m_3\right)\dfrac{\boldsymbol{d_1}}{d_1^3} + Gm_2\left(-\dfrac{\boldsymbol{d_2}}{d_1^3}+\dfrac{\boldsymbol{d}}{d^3}\right)$

[正] $\dfrac{d^2\boldsymbol{d_1}}{dt^2} = -G\left(m_1+m_3\right)\dfrac{\boldsymbol{d_1}}{d_1^3} + Gm_2\left(-\dfrac{\boldsymbol{d_2}}{d_2^3}+\dfrac{\boldsymbol{d}}{d^3}\right)$

P.89 (3.84)式

[誤] $\tilde{E}>0$のとき $\tilde{a} = -\dfrac{Gm_s}{2\tilde{E}}$ (楕円軌道)

$\tilde{E}<0$のとき $\tilde{a} = \dfrac{Gm_s}{2\tilde{E}}$ (双曲線軌道)

[正] $\tilde{E}<0$のとき $\tilde{a} = -\dfrac{Gm_s}{2\tilde{E}}$ (楕円軌道)

$\tilde{E}>0$のとき $\tilde{a} = \dfrac{Gm_s}{2\tilde{E}}$ (双曲線軌道)

第4章

P.99 (4.11)式

[誤] $\ddot{\eta} = \ddot{X}\sin\theta + \ddot{Y}\cos\theta + 2n'\dot{X}\cos\theta - 2n'Y\sin\theta - n'^2X\cos\theta - n'^2Y\cos\theta$

[正] $\ddot{\eta} = \ddot{X}\sin\theta + \ddot{Y}\cos\theta + 2n'\dot{X}\cos\theta - 2n'\dot{Y}\sin\theta - n'^2X\sin\theta - n'^2Y\cos\theta$

P.99 (4.17)式

[誤] $U = -\left(\dfrac{m_1}{m_1+m_2}\dfrac{a'^3}{r_1} + \dfrac{m_2}{m_1+m_2}\dfrac{r'^3}{r_2}\right)n'^2$

[正] $U = -\left(\dfrac{m_1}{m_1+m_2}\dfrac{a'^3}{r_1} + \dfrac{m_2}{m_1+m_2}\dfrac{a'^3}{r_2}\right)n'^2$

P.101 (4.29)式

[誤] $\dfrac{1}{2}\left(\dot{\xi}^2+\dot{\eta}^2+\dot{\zeta}^2\right) - n'\left(\xi\dot{\eta}-\eta\dot{\xi}\right) - \dfrac{Gm_1}{r_1} - \dfrac{Gm_2}{r_2} - \dfrac{Gm_2\boldsymbol{d}\cdot\boldsymbol{r}}{d^3} = const$

[正] $\dfrac{1}{2}\left(\dot{\xi}^2+\dot{\eta}^2+\dot{\zeta}^2\right) - n'\left(\xi\dot{\eta}-\eta\dot{\xi}\right) - \dfrac{Gm_1}{r_1} - \dfrac{Gm_2}{r_2} + \dfrac{Gm_2\boldsymbol{d}\cdot\boldsymbol{r}}{d^3} = const$

P.102 (4.32)式

[誤] $\dfrac{a'}{2a} + \sqrt{\left(1+\dfrac{m_2}{m_1}\right)\dfrac{a}{a'}\left(1-e^2\right)}\cos I = -\dfrac{m_2}{m_1}\left(\dfrac{a'}{r_2} - \dfrac{a\boldsymbol{d}\cdot\boldsymbol{r}}{d^3}\right) + const$

[正] $\dfrac{a'}{2a} + \sqrt{\left(1+\dfrac{m_2}{m_1}\right)\dfrac{a}{a'}\left(1-e^2\right)}\cos I = -\dfrac{m_2}{m_1}\left(\dfrac{a'}{r_2} - \dfrac{a'\boldsymbol{d}\cdot\boldsymbol{r}}{d^3}\right) + const$

P.102 下から7行目行頭

[誤]　I_3とするとき、
[正]　I_2とするとき、

P.105 図4.2

図の距離感がおかしいので見難い。ノートに描き直しあり。

P.108 8行目

[誤]　$c)\ X < -\nu\left(P_2\text{より左の領域}\right) : L_3$
[正]　$c)\ X < -\nu\left(P_1\text{より左の領域}\right) : L_3$

P.111 図4.3

規格化の方法に関する記述はないが、自分のノートに書いてあるとおり$n'a' = 1$という規格化をすると次のような結果になる。

[誤]　$(b)C = 1.9823, (d)C = 1.8562, (f)C = 1.6787$
[正]　$(b)C = 1.9023, (d)C = 1.7761, (f)C = 1.5985$

P.112 下から3行目

[誤]　F点は左へ移りL_1点で一致する
[正]　F点は左へ移りL_2点で一致する

P.115 (4.90)式

[誤]　$\lambda^4 + (4 + a + c)\,\lambda^2 + ac - b^2 = 0$
[正]　$\lambda^4 + \left(4n'^2 + a + c\right)\lambda^2 + ac - b^2 = 0$

P.115 (4.91)式

[誤]　$\sigma^2 + (4 + a + c)\,\sigma + ac - b^2 = 0$
[正]　$\sigma^2 + \left(4n'^2 + a + c\right)\sigma + ac - b^2 = 0$

P.116 下から2行目

[誤]　方程式(4.90)へ代入すると
[正]　方程式(4.91)へ代入すると

P.117 4.6.2小節全体

$a' = 1,\ G = 1,\ m_1 + m_2 = 1$で規格化されているが、それについて説明がない。

P.119-120 4.7節全体

$a' = 1,\ G = 1,\ m_1 + m_2 = 1, n' = 1$で規格化されているが、それについて説明がない。

P.119 下から1-2行目

[誤]　$X = r'\tilde{X}, Y = r'\tilde{Y}$
[正]　$X = r'\tilde{X}, Y = r'\tilde{Y}, Z = r'\tilde{Z}$

P.124 (4.133)式

[誤]　$a^* = \frac{1}{2}(a+c) + \frac{1}{2}\cos 2\alpha + b\sin\alpha$
[正]　$a^* = \frac{1}{2}(a+c) + \frac{1}{2}(a-c)\cos 2\alpha + b\sin\alpha$

P.124 (4.139)式

[誤]　$a^* = \frac{1}{2}(a + b - \sqrt{D^*}) = -\frac{3}{2}(1 - \sqrt{1 - 3\nu(1-\nu)})n'^2 < 0$
[正]　$a^* = \frac{1}{2}(a + c + \sqrt{D^*}) = -\frac{3}{2}(1 - \sqrt{1 - 3\nu(1-\nu)})n'^2 < 0$

P.124 (4.140)式

[誤]　$c^* = \frac{1}{2}(a + b + \sqrt{D^*}) = -\frac{3}{2}(1 + \sqrt{1 - 3\nu(1-\nu)})n'^2 < 0$
[正]　$c^* = \frac{1}{2}(a + c - \sqrt{D^*}) = -\frac{3}{2}(1 + \sqrt{1 - 3\nu(1-\nu)})n'^2 < 0$

P.125 (4.145)式

[誤]　$\ddot{x} - 2n'\dot{y^*} + a^*x^* = 0$
[正]　$\ddot{x^*} - 2n'\dot{y^*} + a^*x^* = 0$

第5章

P.137 (5.12)式

[誤]　$\frac{1}{2}\dot{x}^2 + \frac{1}{2}\omega_0^2 + \frac{1}{3}\epsilon x^3 = E$
[正]　$\frac{1}{2}\dot{x}^2 + \frac{1}{2}\omega_0^2 x^2 + \frac{1}{3}\epsilon x^3 = E$

P.137 (5.13)式

[誤]　$\frac{1}{2}\omega_0^2 + \frac{1}{3}\epsilon x^3 \leq E$
[正]　$\frac{1}{2}\omega_0^2 x^2 + \frac{1}{3}\epsilon x^3 \leq E$

P.139 (5.29)式

[誤] $x = a\cos t + \epsilon a^2\left(-\frac{1}{2} + \frac{1}{6}\cos 2t\right) + \epsilon^2 a^3\left(\frac{5}{12}t\sin t + \frac{1}{48}\cos 3t + \mathcal{O}(\epsilon^3)\right)$

[正] $x = a\cos t + \epsilon a^2\left(-\frac{1}{2} + \frac{1}{6}\cos 2t\right) + \epsilon^2 a^3\left(\frac{5}{12}t\sin t + \frac{1}{48}\cos 3t\right) + \mathcal{O}(\epsilon^3)$

P.143 (5.68)式

[誤] $\frac{da}{dt}\sin\theta - a\frac{d\phi}{dt}\cos\theta = \epsilon a^2\cos^2\theta$

[正] $\frac{da}{dt}\sin\theta + a\frac{d\phi}{dt}\cos\theta = \epsilon a^2\cos^2\theta$

P.144 (5.75)式

[誤] $\frac{d\phi_1}{dt} = \frac{1}{4}\left(2\cos\theta_0 + \cos 3\theta_0\right)$

[正] $\frac{d\phi_1}{dt} = \frac{1}{4}a_0\left(3\cos\theta_0 + \cos 3\theta_0\right)$

P.144 下から4行目

ϕ_0が定数であれば、この後の一般解を導出することはできるが、テキストではさらに$\phi_0 = 0$の条件を導入して、計算を簡略化している。しかし、それについての説明がない。

P.145 (5.86)式

[誤] $x = \left(a_0 + \epsilon a_1 + \epsilon^2 a_2\right)\left(\theta^* + \epsilon\phi_1 + \epsilon^2\phi_{2p}\right)$

[正] $x = \left(a_0 + \epsilon a_1 + \epsilon^2 a_2\right)\cos\left(\theta^* + \epsilon\phi_1 + \epsilon^2\phi_{2p}\right)$

P.147 7行目

[誤] $-\partial g_1/\partial c_l, \partial g_2/\partial c_l, -\partial g_3/\partial c_l$

[正] $-\partial g_1/\partial c_l, -\partial g_2/\partial c_l, -\partial g_3/\partial c_l$

P.148 (5.102)式

[誤] $\frac{dq_i}{dt} = \frac{\partial F}{\partial p_i} = p + \frac{\partial V}{\partial p_i}$

[正] $\frac{dq_i}{dt} = \frac{\partial F}{\partial p_i} = p_i + \frac{\partial V}{\partial p_i}$

P.148 (5.108)式

[誤] $\sum_{j=1}^{6}\frac{\partial f_i}{\partial c_j}\frac{dc_j}{dt} = \frac{\partial V}{\partial p_1}$

[正] $\sum_{j=1}^{6}\frac{\partial f_i}{\partial c_j}\frac{dc_j}{dt} = \frac{\partial V}{\partial p_i}$

P.154 6行目

[誤]　ここで$t=0$における軌道要素が$c_j(0)$となる軌道$x_i^*(t)$を考え、
[正]　ここで軌道要素が$c_j(0)$の値のまま変化しない軌道$x_i^*(t)$を考え、

P.156 (5.166)式

[誤]　$\frac{de}{dt} = -\frac{\eta}{na^2e}(1-\eta)\frac{\partial R}{\partial \epsilon} - \frac{\eta}{na^2e}\frac{\partial R}{\partial \omega}$
[正]　$\frac{de}{dt} = -\frac{\eta}{na^2e}(1-\eta)\frac{\partial R}{\partial \epsilon} - \frac{\eta}{na^2e}\frac{\partial R}{\partial \tilde{\omega}}$

P.158 (5.180)式

[誤]　$\frac{\partial R}{\partial \tilde{\omega}} = p\frac{\partial R}{\partial q} - q\frac{\partial R}{\partial q}$
[正]　$\frac{\partial R}{\partial \tilde{\omega}} = q\frac{\partial R}{\partial p} - p\frac{\partial R}{\partial q}$

P.169 図5.4

$d\beta$に注意。テキストの図では軌道と軌道の角度が$d\beta$のようにみえるが、軌道面と軌道面の角度が$d\beta$である。

P.169 (5.244)式

[誤]　$-d\omega = N'H = \cos I d\Omega$
[正]　$-d\omega = NH = \cos I d\Omega$

正確にはノートのように単位球面に写して考えるべき

P.172 (13-17行目)

ρについての説明が間違い。方程式の右辺が正弦級数となるのはa, e, I、余弦級数となるのは$\rho, \tilde{\omega}, \Omega, \epsilon$。もちろん、これに応じて各軌道要素の1次の解が余弦級数となるのは、a, e, I。正弦級数となるのは、$\rho, \tilde{\omega}, \Omega, \epsilon$。

P.172 下から6行目

[誤]　$j_1 = j_2 = 0$
[正]　$j_1 = {j_1}' = 0$

P.172-173 (5.264),(5.266),(5.267),(5.268),(5.270)式
P.176 1行目

[誤]　j_4
[正]　${j_1}'$

P.173 (5.265)式

[誤] $\dfrac{da}{dt} = -\dfrac{2}{n_0 a_0} j_1 C_p \sin\theta_p$

[正] $\dfrac{da}{dt} = -\dfrac{2}{n_0 a_0} \displaystyle\sum_{j_1 \neq 0, j_1{}' \neq 0} j_1 C_p \sin\theta_p$

第6章

P.184 3行目

[誤] $dl = (a/r)^2/\eta df$

[正] $dl = \dfrac{r^2}{a^2\eta} df$

P.185 (6.16)式

[誤] $\dfrac{d\Omega}{dt} = -\dfrac{1}{na^2\eta\sin I}\dfrac{\partial R_s}{\partial I}$

[正] $\dfrac{d\Omega}{dt} = \dfrac{1}{na^2\eta\sin I}\dfrac{\partial R_s}{\partial I}$

P.187 (6.22)式

[誤] $R_{p2} = \dfrac{\eta {a_E}^2}{a_3} J_2 C_2 P_2$

[正] $R_{p2} = \dfrac{\eta {a_E}^2}{a^3} J_2 C_2 P_2$

P.188 (6.30)式

[誤] $\dfrac{d\sigma}{dt} = -\mu {a_E}^2 J_2 C_1 \left[\dfrac{\eta^2}{na^5 e} C_1 \displaystyle\int \dfrac{\partial P_1}{\partial e} dt + \dfrac{2}{na}\dfrac{\partial}{\partial a}\left(\dfrac{1}{a^3}\right)\int P_1 dt\right]$

[誤] $\mathit{\Delta}_1\sigma = -\mu {a_E}^2 J_2 C_1 \left[\dfrac{\eta^2}{na^5 e} \displaystyle\int \dfrac{\partial P_1}{\partial e} dt + \dfrac{2}{na}\dfrac{\partial}{\partial a}\left(\dfrac{1}{a^3}\right)\int P_1 dt\right]$

P.188 (6.31)式

[誤] $\dfrac{d\omega}{dt} = \dfrac{\mu {a_E}^2}{a^3} J_2 \left(-\dfrac{\cos i}{na^2\eta\sin I}\dfrac{\partial C_1}{\partial I}\displaystyle\int P_1 dt + \dfrac{\eta}{na^2 e} C_1 \int \dfrac{\partial P_1}{\partial e} dt\right)$

[正] $\mathit{\Delta}_1\omega = \dfrac{\mu {a_E}^2}{a^3} J_2 \left(-\dfrac{\cos I}{na^2\eta\sin I}\dfrac{\partial C_1}{\partial I}\displaystyle\int P_1 dt + \dfrac{\eta}{na^2 e} C_1 \int \dfrac{\partial P_1}{\partial e} dt\right)$

P.188 (6.32)式

[誤] $\dfrac{d\Omega}{dt} = \dfrac{\mu {a_E}^2}{na^5\eta\sin I}\dfrac{\partial C_1}{\partial I}\displaystyle\int P_1 dt$

[正] $\mathit{\Delta}_1\Omega = \dfrac{\mu {a_E}^2}{na^5\eta\sin I} J_2 \dfrac{\partial C_1}{\partial I}\displaystyle\int P_1 dt$

P.188 下から4行目

[誤] $\partial P/\partial e$
[正] $\partial P_1/\partial e$

P.188 (6.33)式

[誤] $\dfrac{\partial P_1}{\partial e} = 3\left[\left(\dfrac{a}{r}\right)^3 \cos f - \dfrac{e}{\eta^5}\right]$

[正] $\dfrac{\partial P_1}{\partial e} = 3\left[\left(\dfrac{a}{r}\right)^4 \cos f - \dfrac{e}{\eta^5}\right]$

P.189 (6.34)式

[誤] $\dfrac{1}{n\eta}\displaystyle\int \dfrac{r}{a} df$

[正] $\dfrac{1}{n\eta}\displaystyle\int \dfrac{a}{r} df$

P.189 (6.38)式

[誤] $\displaystyle\int \dfrac{\partial P_1}{\partial e}$

[正] $\displaystyle\int \dfrac{\partial P_1}{\partial e} dt$

P.189 (6.40)式

[誤] $\mathit{\Delta}_1 \Omega = -\dfrac{3}{2} J_2 \left(\dfrac{a_E}{a\eta^2}\right)^2 B \cos I$

[正] $\mathit{\Delta}_1 \Omega = -\dfrac{3}{2} J_2 \left(\dfrac{a_E}{p}\right)^2 B \cos I$

間違いではないが、この形の方が自然。

P.189 (6.42)式

[誤] $\mathit{\Delta}_1 \sigma = -n^2 a^3 {a_E}^2 J_2 \left[\dfrac{\eta^2}{na^5 e} C_1 \dfrac{3}{n\eta^5}(eB + Q) - \dfrac{6}{na^5}\dfrac{B}{n\eta^3}\right]$

[正] $\mathit{\Delta}_1 \sigma = -n^2 a^3 {a_E}^2 J_2 \left[\dfrac{\eta^2}{na^5 e} \dfrac{3}{n\eta^5}(eB + Q) - \dfrac{6}{na^5}\dfrac{B}{n\eta^3}\right]$

P.192 (6.60)式

[誤] $\omega^* = \left[\dfrac{3}{4} J_2 \left(\dfrac{a_E}{p_0}\right)^2 (5\cos^2 I - 1)\right] n_0 t + \omega_0$

[正] $\omega^* = \left[\dfrac{3}{4} J_2 \left(\dfrac{a_E}{p_0}\right)^2 (5\cos^2 I_0 - 1)\right] n_0 t + \omega_0$

P.192 (6.61)式

[誤] $\Omega^* = -\left[\frac{3}{2}J_2\left(\frac{a_E}{p_0}\right)^2\cos I\right]n_0 t + \Omega_0$

[正] $\Omega^* = -\left[\frac{3}{2}J_2\left(\frac{a_E}{p_0}\right)^2\cos I_0\right]n_0 t + \Omega_0$

P.197 (6.81)式

[誤] $\ddot{y} = -\frac{\mu}{r^3}x - \frac{3}{2}J_2\frac{{a_E}^2}{r^5}y$

[正] $\ddot{y} = -\frac{\mu}{r^3}y - \frac{3}{2}J_2\frac{{a_E}^2}{r^5}y$

P.197 (6.83)式

[誤] $R_3 = -\frac{\mu {a_E}^3}{r^4}J_3 P_3\left(\sin\phi\right) = -\frac{\mu {a_E}^3}{2r^4}J_3\sin\phi\left(5\sin^2\phi - 3\right)$

[正] $R_3 = -\frac{\mu {a_E}^3}{r^4}J_3 P_3\left(\sin\varphi\right) = -\frac{\mu {a_E}^3}{2r^4}J_3\sin\varphi\left(5\sin^2\varphi - 3\right)$

P.197 (6.84)式

[誤] $R_3 = \frac{\mu {a_E}^3}{2r^4}J_3\left[\frac{3}{8}\sin I\left(5\cos^2 I - 1\right)\sin\left(f+\omega\right) + \frac{1}{8}\sin 3\left(f+\omega\right)\right]$

[正] $R_3 = \frac{\mu {a_E}^3}{r^4}J_3\left[\frac{3}{8}\sin I\left(5\cos^2 I - 1\right)\sin\left(f+\omega\right) + \frac{5}{8}\sin^3 I\sin 3\left(f+\omega\right)\right]$

P.198 (6.85)式

[誤] $R_{3s} = \frac{1}{2\pi}\int R_3 dl = P(a,e,I)e\sin\omega$

[正] $R_{3s} = \frac{1}{2\pi}\int R_3 dl = P(a,e,I)\sin\omega$

P.198 (6.86)式

[誤] $P(a,e,I) = \frac{3}{8}\frac{\mu {a_E}^3}{a^4\eta^5}J_3\sin I(5\cos^2 I - 1)$

[正] $P(a,e,I) = \frac{3}{8}\frac{\mu {a_E}^3}{a^4\eta^5}J_3 e\sin I(5\cos^2 I - 1)$

P.198 (6.88)式

[誤] $\frac{dI}{dt} = \frac{3}{8}\frac{\mu {a_E}^3}{na^6\eta^4}J_3 e\cos I\left(5\cos^2 I - 1\right)\cos\omega$

[正] $\frac{dI}{dt} = \frac{3}{8}\frac{\mu {a_E}^3}{na^6\eta^6}J_3 e\cos I\left(5\cos^2 I - 1\right)\cos\omega$

P.199 1行目

[誤]　式定式(6.89)
[正]　方程式(6.87)

P.200 (6.100)式

[誤]　$\dfrac{\partial n_2}{\partial e} = 3J_2 \dfrac{en}{a^2\eta^6}\left(5\cos^2 I - 1\right)$

[正]　$\dfrac{\partial n_2}{\partial e} = 3J_2 \dfrac{a_E^2 en}{a^2\eta^6}\left(5\cos^2 I - 1\right)$

P.200 (6.101)式

[誤]　$\dfrac{\partial n_2}{\partial I} = -\dfrac{15}{2} J_2 \dfrac{n\sin I\cos I}{a^2\eta^4}$

[正]　$\dfrac{\partial n_2}{\partial I} = -\dfrac{15}{2} J_2 \dfrac{a_E^2 n\sin I\cos I}{a^2\eta^4}$

P.200 (6.102)式

[誤]　$\dfrac{\partial P}{\partial e} = \dfrac{3}{8} J_3 \dfrac{n^2}{a\eta^7}\left(1+4e^2\right)\sin I\left(5\cos^2 I - 1\right)$

[正]　$\dfrac{\partial P}{\partial e} = \dfrac{3}{8} J_3 \dfrac{a_E^3 n^2}{a\eta^7}\left(1+4e^2\right)\sin I\left(5\cos^2 I - 1\right)$

P.200 (6.103)式

[誤]　$\dfrac{\partial P}{\partial I} = \dfrac{3}{8} J_3 \dfrac{n^2}{a\eta^5}\cos I\left(15\cos^2 I - 11\right)$

[正]　$\dfrac{\partial P}{\partial I} = \dfrac{3}{8} J_3 \dfrac{a_E^3 en^2}{a\eta^5}\cos I\left(15\cos^2 I - 11\right)$

P.200 (6.104)式

[誤]　$\dfrac{d\delta\omega}{dt} = \dfrac{3}{8} J_3 \dfrac{n_0}{a_0^3\eta_0^6} \dfrac{\left(5\cos^2 I_0 - 1\right)\left(\sin^2 I_0 - e_0^2\cos^2 I_0\right)}{e_0\sin I_0}\sin\omega^*$

[正]　$\dfrac{d\delta\omega}{dt} = \dfrac{3}{8} J_3 \dfrac{a_E^3 n_0}{a_0^3\eta_0^6} \dfrac{\left(5\cos^2 I_0 - 1\right)\left(\sin^2 I_0 - e_0^2\cos^2 I_0\right)}{e_0\sin I_0}\sin\omega^*$

P.201 (6.113)式

[誤]　$\delta(l+\omega) = \dfrac{J_3 a_E}{2J_2 p_0}\left(\dfrac{1+\eta_0+\eta^2}{1+\eta_0}\sin I_0 + \dfrac{\cos^2 I_0}{\sin I_0}\right)e_0\cos\omega^*$

[正]　$\delta(l+\omega) = \dfrac{J_3 a_E}{2J_2 p_0}\left(-\dfrac{1+\eta_0+\eta_0^2}{1+\eta_0}\sin I_0 + \dfrac{\cos^2 I_0}{\sin I_0}\right)e_0\cos\omega^*$

P.202 P_ωの式

[誤]　$P_\omega = 5.233 \times 10^6$秒
[正]　$P_\omega = 5.233 \times 10^7$秒

P.206 (6.131)式

[誤]　$\frac{1}{2\pi}\int_0^{2\pi} R_S d\lambda_S = \frac{Gm_s}{a_s^3}\left[\frac{1}{8}\left(3\cos^2\bar{I} - 1\right) + \frac{3}{8}\sin^2\bar{I}\cos 2\bar{L}\right]$
[正]　$\frac{1}{2\pi}\int_0^{2\pi} R_S d\lambda_S = \frac{Gm_s r^2}{a_s^3}\left[\frac{1}{8}\left(3\cos^2\bar{I} - 1\right) + \frac{3}{8}\sin^2\bar{I}\cos 2\bar{L}\right]$

P.207 (6.132),(6.133)式の後ろへ追加

$$\frac{1}{2\pi}\int_0^{2\pi}\left(\frac{r}{a}\right)^2 \sin 2f dl = 0$$

P.207 (6.134)式

[誤]　$R_{S,sec} = \frac{Gm_s}{a_s^3}\left[\frac{1}{8}\left(1 + \frac{3}{2}e^2\right)\left(3\cos^2\bar{I} - 1\right) + \frac{15}{16}e^2\sin^2\bar{I}\cos 2\bar{\omega}\right]$
[正]　$R_{S,sec} = \frac{Gm_s a^2}{a_s^3}\left[\frac{1}{8}\left(1 + \frac{3}{2}e^2\right)\left(3\cos^2\bar{I} - 1\right) + \frac{15}{16}e^2\sin^2\bar{I}\cos 2\bar{\omega}\right]$

P.208 (6.141)式

[誤]　$C = \frac{3}{16}\alpha\sin^2\epsilon^2$
[正]　$C = \frac{3}{16}\alpha\sin^2\epsilon$

P.208 (6.145)式

[誤]　$R_{SEC} = n^2a^3\left[-(3A - C)q^2 - (3A + C)p^2 + 2Bq\right]$
[正]　$R_{SEC} = n^2a^3\left[-(3A - C)q^2 - (3A + C)p^2 + 2Bq + 2A\right]$
少し自信ない

P.208 (6.150)式

[誤]　$p = -c\sqrt{\frac{1 + C/3A}{1 - C/3A}}\sin(\rho t + \gamma)$
[正]　$p = -c\sqrt{\frac{1 - C/3A}{1 + C/3A}}\sin(\rho t + \gamma)$

P.210 (6.150)式

[誤] $R = \frac{\mu}{r} \sum_{n=2}^{\infty} \sum_{m=1}^{n} P_n^m(\sin\varphi)(C_{n,m} \cos m\psi + S_{n,m} \sin m\psi)$

[正] $R = \frac{\mu}{r} \sum_{n=2}^{\infty} \sum_{m=1}^{n} \left(\frac{a_E}{r}\right)^n P_n^m(\sin\varphi)(C_{n,m} \cos m\psi + S_{n,m} \sin m\psi)$

P.212 (6.162)式

[誤] $\beta = tan^{-1}\left(\frac{S_{2,2}}{C_{2,2}}\right) = 29.4^{\circ}$

[正] $\beta = tan^{-1}\left(-\frac{S_{2,2}}{C_{2,2}}\right) = 29.4^{\circ}$

P.212 下から1行目

[誤] $0 < \psi + \beta/2 < \pi/2$
[正] $0 < \psi + \beta/2 < \pi$

P.213 (6.169)式

[誤] $|\chi| \leq \alpha$
[正] $|\chi| < \alpha$

P.215 (6.176)式

[誤] $\sin^2 I = q^2 + p^2 = 4g^2 \sin^2 \rho t$
[正] $\sin^2 I = q^2 + p^2 = 2g^2(1 - \cos\rho t) \sim (g\rho t)^2$

P.215 (6.177)式

[誤] $\sin I = 2g \sin\rho t$
[正] $\sin I = g\rho t$

P.215 (6.178)式

[誤] $I \sim 2g\sin\rho t \sim 2g\rho t = 6.653 \times 10^{-6} nt = (2^{\circ}.40 \times 10^{-3}/日)t$

[正] $I \sim g\rho t = 6.653 \times 10^{-6} nt = (2^{\circ}.40 \times 10^{-3}/日)t$

P.219 1行目

[誤] 式(6.190)へ代入
[正] 式(6.191)へ代入

P.219 3行目

[誤] $\dfrac{365.22}{2\times 17}\times 0.12 = 1.3m/s$

[正] $\dfrac{365.25}{2\times 17}\times 0.12 = 1.3m/s$

付録

P.221 下から2行目

[誤] 直行行列

[正] 直交行列

P.222 (A.11)式

[誤] $[\sigma,\Omega] = \left(\dfrac{\partial \boldsymbol{\gamma}^*}{\partial\sigma}\right)^t B_1\dot{\boldsymbol{r}} - \boldsymbol{r}^{*t}B_1^t\dfrac{\partial\dot{\boldsymbol{r}}^*}{\partial\sigma}$

[正] $[\sigma,\Omega] = \left(\dfrac{\partial \boldsymbol{r}^*}{\partial\sigma}\right)^t B_1\dot{\boldsymbol{r}} - \boldsymbol{r}^{*t}B_1^t\dfrac{\partial\dot{\boldsymbol{r}}^*}{\partial\sigma}$

P.225 下から4行目

[誤] 単位をベクトルを$\boldsymbol{i}^*$

[正] 単位ベクトルを$\boldsymbol{i}^*$

P.231 (B.47)式

[誤] $\dfrac{(\boldsymbol{r}\times\dot{\boldsymbol{r}})\times\boldsymbol{r}}{\boldsymbol{r}^3}$

[正] $\dfrac{(\boldsymbol{r}\times\dot{\boldsymbol{r}})\times\boldsymbol{r}}{r^3}$

P.231 (B.50)式

[誤] $\dfrac{de}{dt} = \dfrac{\mu}{na}\left[R\sin f + S(\cos f + \cos u)\right]$

[正] $\dfrac{de}{dt} = \dfrac{\eta}{na}\left[R\sin f + S(\cos f + \cos u)\right]$

P231 4式目

[誤] $\dfrac{\partial r}{\partial a} = \dfrac{r}{a} + \dfrac{ae}{\eta}\sin f\dfrac{dn}{dt}t$

[正] $\dfrac{\partial r}{\partial a} = \dfrac{r}{a} + \dfrac{ae}{\eta}\sin f\dfrac{dn}{da}t$