Errata List for the AIAA Education Series Text Book

Analytical Mechanics of Space Systems

1st Edition, 1st Printing

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Last updated on September 30, 2005

This file contains various typos that were found in the first printing of the 1st edition of the text book. Please use this page to update your book copy. A 2nd printing has not been released which fixes many of these typos. ***This first printing errata sheet is no longer updated!*** A 2nd printing errata sheet contains any typos which were found after the deadline for the 2nd printing. If you find typos that are not listed in this errata document, check the errata2.pdf document to see if it contains your error. If not, please contact the author at schaub@vt.edu and email the typo type, as well as the typo location within the manuscript. A revision history is provided at the end of the document.

- p. 30, Eq. (2.6): $V_G(\mathbf{r}_{12}) = -\frac{Gm_1m_2}{|\mathbf{r}_{12}|} = -\frac{Gm_1m_2}{r_{12}}$
- p. 41, After Eq. (2.37)): strike the statement "or $\boldsymbol{r} = \boldsymbol{r}_p$". The only condition for $\dot{\boldsymbol{H}} = \boldsymbol{L}$ for a particle is that r_p is inertial (non-accelerating).
- p. 41, first equation in Ex. 2.6:): Missing a dot on θ, should read $\boldsymbol{\omega}_{\mathcal{E}/\mathcal{N}} = \dot{\theta}\hat{\boldsymbol{e}}_3 = -\dot{\theta}\hat{\boldsymbol{n}}_3$
- p. 45, Eq. (2.47): The letter "c" on the LHS should be a subscribt (i.e. $M\ddot{\boldsymbol{R}}_c = \cdots$)
- p. 58, 8th line after Section 2.6: change the word "aftward" to "backwards"
- p. 58, Section 2.6, 2nd paragraph: change text to " ... we utilize Eq. (2.72) or (2.93), which state ... "
- p. 85, Ex. 3.2: The final 3-2-1 Euler angles are incorrect. They should be $\psi = -0.933242^{o}$, $\theta = -72.3373^{o}$, and $\phi = 79.9635^{o}$.
- p. 96, Eq. (3.92): The top right entry of this matrix is missing an opening bracket. It should read $2(\beta_1\beta_3 - \beta_0\beta_2)$.
- p. 122, Eq. (3.197): Should read $[\mathcal{NB}]^{-1} = \cdots$
- p. 131, first equation in Ex. 4.1: Missing a dot on ϕ, should read $\dot{\theta} = \frac{L}{r}\dot{\phi}$
- p. 133, Example 4.1: After the first equation on the top of p. 133, change the text to: The normal force is defined as $\boldsymbol{N} = N\hat{\boldsymbol{e}}_3$, and the gravity force is given by $\boldsymbol{F}_g = -mg\hat{\boldsymbol{e}}_3$. Note that at the hinge point only the torques $\boldsymbol{\tau}_\phi = \tau_\phi\hat{\boldsymbol{e}}_\phi$ and $\boldsymbol{\tau}_3 = \tau_3\hat{\boldsymbol{e}}_3$ are applied. The external torque about point O is

$$\boldsymbol{L}_O = \boldsymbol{R}_c \times (\boldsymbol{R}_c + \boldsymbol{N}) + \boldsymbol{\tau}_\phi + \boldsymbol{\tau}_3 = (L(mg - N) + \tau_\phi)\,\hat{\boldsymbol{e}}_\phi + \tau_3\hat{\boldsymbol{e}}_3$$

Note that by taking the moments about point O the reaction forces of the pin joint O do not appear. Using Euler's equation $\dot{\boldsymbol{H}}_O = \boldsymbol{L}_O$ and equating vector components, we find

$$
\begin{aligned}
N &= mg + \frac{I_s}{r}\dot{\phi}^2 + \tau_\phi \\
\tau_3 &= 0
\end{aligned}
$$

To express τ_ϕ, we compute all moments and torque about the disk center of mass and find

$$
\begin{aligned}
\boldsymbol{H}_c &= [I_c]\boldsymbol{\omega}_{\mathcal{B}/\mathcal{N}} = -I_s\frac{L}{r}\dot{\phi}\hat{\boldsymbol{e}}_L + I_t\dot{\phi}\hat{\boldsymbol{e}}_3 \\
\boldsymbol{L}_c &= F_f r\hat{\boldsymbol{e}}_L - \tau_\phi\hat{\boldsymbol{e}}_\phi - \tau_3\hat{\boldsymbol{e}}_3
\end{aligned}
$$

where F_f is the frictional force at the contact point which causes the disk rotation. Using $\tau_3 = 0$ and $\dot{\boldsymbol{H}}_c = \boldsymbol{L}_c$, we find

$$
\begin{aligned}
F_f &= 0 \\
\tau_\phi &= I_s\frac{L}{r}\dot{\phi}^2
\end{aligned}
$$

Note that if $\dot{\phi}$ were not 0, then we would have a non-zero F_f term. Finally, the normal force magnitude is expressed as

$$
N = mg + 2\frac{I_s}{r}\dot{\phi}
$$

The polar moment of inertia of a circular disk of mass m and radius r is

$$
I_s = \frac{m}{2}r^2
$$

which allows N to be written as

$$
N = m\left(g + r\dot{\phi}^2\right)
$$

- p. 140, Ex. 4.3, 2nd equation from bottom: Should read $\ddot{\boldsymbol{r}}_c = -(R+r)\dot{\theta}^2\hat{\boldsymbol{e}}_r + (R+r)\ddot{\theta}\hat{\boldsymbol{e}}_\theta$
- p. 142, sentence before Eq. 4.56: Strike one of the "the" words. Should read "Let us write the angular momentum..."
- p. 147, Fig 4.7: The sepratrix arrow directions were corrected, as shown in Fig. 1 of this document.
- p. 148, Eq. (4.68): missing a negative sign. Should read $\cdots = -H\hat{\boldsymbol{n}}_3 = \cdots$
- p. 156, Eq. 4.102: Missing a subscript "W". Should read $\dot{\boldsymbol{H}}_W = \cdots$
- p. 157, Eq. 4.110: In the last term of this equation, the subscript is wrong. It should read $\cdots + (J_t - J_s)\omega_s\omega_t\hat{\boldsymbol{g}}_g$
- p. 161, Eq. 4.126: The last line of this equation should read

$$
\approx \frac{1}{R_c^3}\left(1 - 3\frac{\boldsymbol{R}_c\cdot\boldsymbol{r}}{R_c^2} - \frac{3}{2}\left(\frac{\boldsymbol{r}\cdot\boldsymbol{r}}{R_c^2}\right) + \frac{15}{2}\left(\frac{\boldsymbol{R}_c\cdot\boldsymbol{r}}{R_c^2}\right)^2 + \cdots\right)
$$

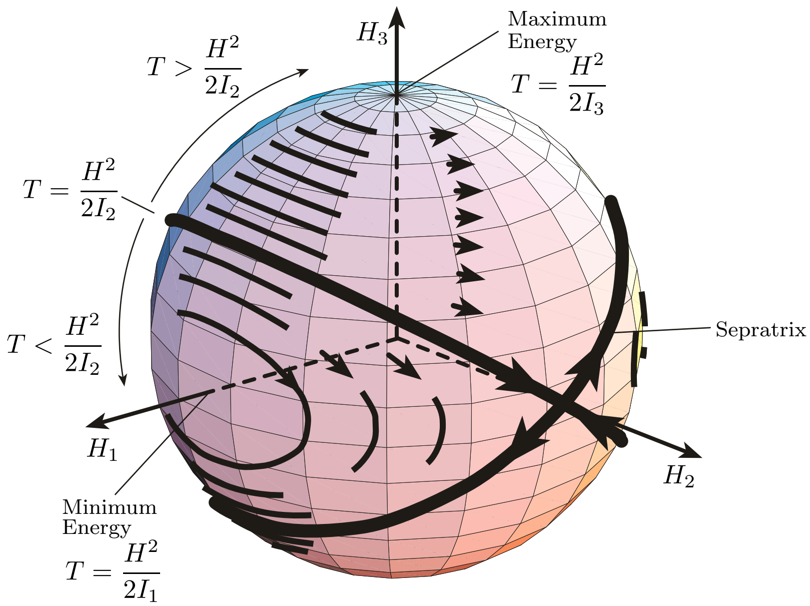

Figure 1: (Fig. 4.7) A Family of Energy Ellipsoid and Momentum Sphere Intersections

- p. 162, last sentence before Eq. 4.127: Change to "Substituting up to first order terms of Eq. (4.126) into Eq. (4.125) yields"
- p. 162, Eq. 4.130: Missing brackets around $\boldsymbol{r} \times \boldsymbol{R}_c$. Should read $\cdots \int_{\mathcal{B}} -(\boldsymbol{r} \times (\boldsymbol{r} \times \boldsymbol{R}_c) + (\boldsymbol{r} \cdot \boldsymbol{r})\boldsymbol{R}_c)\,\mathrm{d}m$
- p. 162, Eq. 4.132: Missing an equal sign right after the vector $\boldsymbol{L}_G$.
- p. 163, sentence before Eq. 4.136: " ... the resulting product, dropping terms higher than 2^{nd} order results in the gravity force vector $\boldsymbol{F}_G$ being expressed as"
- p. 163, Eq. 4.136: change equation to:

$$\boldsymbol{F}_G = -\frac{GM_e}{R_c^3}\left[\int_{\mathcal{B}} \boldsymbol{r}\mathrm{d}m - \frac{3}{R_c^3}\int_{\mathcal{B}} (\boldsymbol{r} \cdot \boldsymbol{R}_c)\boldsymbol{r}\mathrm{d}m + \boldsymbol{R}_c \int_{\mathcal{B}} \mathrm{d}m - \frac{3}{R_c^2}\int_{\mathcal{B}} (\boldsymbol{R}_c \cdot \boldsymbol{r})\boldsymbol{R}_c \mathrm{d}m \right.$$
$$\left. - \frac{3}{2R_c^2}\int_{\mathcal{B}} \boldsymbol{R}_c(\boldsymbol{r} \cdot \boldsymbol{r})\mathrm{d}m + \frac{15}{2R_c^4}\int_{\mathcal{B}} (\boldsymbol{R}_c \cdot \boldsymbol{r})^2 \boldsymbol{R}_c \mathrm{d}m\right]$$

- p. 163, paragraph prior to Eq. 4.137: Change to "Note that the first and last term in the ... "
- p. 163, Eq. 4.137: Change equation to:

$$\boldsymbol{F}_G = -\frac{GM_e}{R_c^3}\left[m\boldsymbol{R}_c - \frac{3}{R_c^2}\int_{\mathcal{B}} \Big(\boldsymbol{r} \times (\boldsymbol{r} \times \boldsymbol{R}_c) + r^2 \boldsymbol{R}_c\Big)\mathrm{d}m - \frac{3}{2R_c^2}\int_{\mathcal{B}} r^2 \boldsymbol{R}_c \mathrm{d}m \right.$$
$$\left. + \frac{15}{2R_c^4}\int_{\mathcal{B}} \boldsymbol{R}_c \cdot \Big(\boldsymbol{r} \times (\boldsymbol{r} \times \boldsymbol{R}_c) + r^2 \boldsymbol{R}_c\Big)\boldsymbol{R}_c \mathrm{d}m\right]$$

- p. 164, top of page: delete the text "where the last term in the parenthesis is zero due to the definition of the center of mass."

- p. 164, top of page: Change 2nd sentence to "Using the definition of the inertia matrix in Eq. (4.14), as well as $\hat{\boldsymbol{\imath}}_r = \boldsymbol{R}_c/R_c$ and $\int_{\mathcal{B}} r^2 \mathrm{d}m = \frac{1}{2}\mathrm{tr}([I])$, the gravity force vector of a rigid ... "

- p. 164, Eq. 4.138: Change equation to

$$\boldsymbol{F}_G = -\frac{\mu m}{R_c^3}\left[1 + \frac{3}{mR_c^2}\left([I] + \frac{1}{2}\Big(\mathrm{tr}([I]) - 5(\hat{\boldsymbol{\imath}}_r^T[I]\hat{\boldsymbol{\imath}}_r)\Big)[I_{3\times 3}]\right)\right]\boldsymbol{R}_c$$

- p. 169, Eq. 4.165, 4.167 and Fig. 4.12 the Y and R index got reverse here in the text. Eq. 4.165 should read $(1 + 3k_Y + k_Y k_R)^2 > 16 k_Y k_R$, while Eq. 4.167 should read $k_R < k_Y$. A corrected figure is shown in Figure 2.

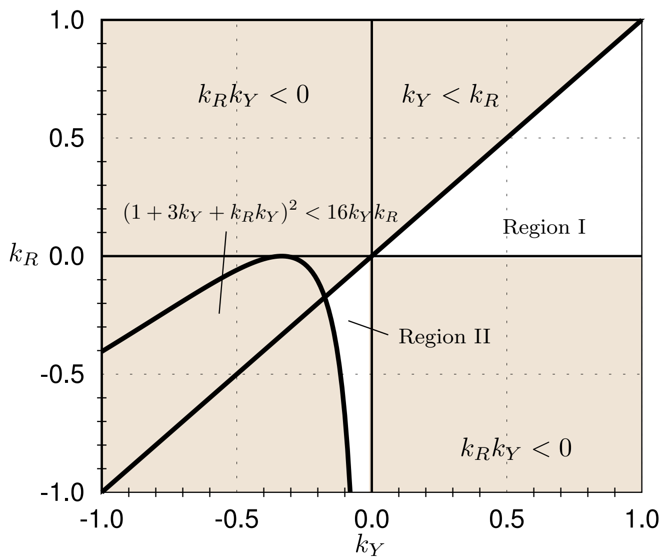

Figure 2: (Fig. 4.12) Linearized Gravity Gradient Spacecraft Stability Regions

- p. 170, 5th line after Eq. 4.168): "*Omega*" should be greek letter Ω.

- p. 187, Eq. (5.35): The 4 times that m occurs in these two equations, we need to replace m with m_2.

- p. 187, E. (5.37), 2nd line, last term: Replace m with m_2.

- p. 189, before Eq. (5.46): Missing brackets around vector cross products, should read $\boldsymbol{a} \cdot (\boldsymbol{b} \times \boldsymbol{c}) = -(\boldsymbol{b} \times \boldsymbol{a}) \cdot \boldsymbol{c}$.

- p. 266, before Eq. (7.6): The second term within the $\{\dots\}$ brackets should read $\left[\frac{\partial \mathcal{L}}{\partial \ddot{q}_i}\ddot{q}_i\right]$

- p. 266, before Eq. (7.7): The term $\dot{q}_i$ is missing after the $\{\dots\}$ brackets.

- p. 270, before Eq. (7.24): Please replace $\dot{p}_x$ with $\dot{p}_y$.

- p. 276, Eq. (7.55): The right hand side of this equation should read $\equiv F(\boldsymbol{q}, \dot{\boldsymbol{q}}, t)$.
- p. 276, Eq. (7.57): $\boldsymbol{p} = [B(\boldsymbol{q}, t)]\dot{\boldsymbol{q}} \equiv \cdots$ The double-dot should be a single dot over $\boldsymbol{q}$.
- p. 277, Eq. (7.60): $\left[\frac{\partial \mathcal{F}}{\partial q_j}\right]_{\mathbf{q},\mathbf{p}} \equiv \cdots$.
- p. 307, 3rd line from top of page: should read $\dot{V} \leq -\lambda V$
- p. 315, Eq. (8.40): Should read $\dot{\boldsymbol{p}} = -\frac{\partial \mathcal{H}}{\partial \dot{\boldsymbol{q}}} + \boldsymbol{Q}$
- p. 329, Eq. (8.87): $\cdots = -2K^2 \boldsymbol{\sigma}^T \left([I]^{-1}\right)[P]\left([I]^{-1}\right)\boldsymbol{\sigma}$
- p. 333, Eq. (8.105): $\cdots = -2K^2 \boldsymbol{\sigma}^T \left([I]^{-1}\right)[P]\left([I]^{-1}\right)\boldsymbol{\sigma}$
- p. 334, Eq. (8.108): $\lim_{t\to\infty} \mathbf{z} = [K_I]^{-1}[P]^{-1}\Delta\mathbf{L}$
- p. 355, Eq. (8.174): Last bracket term should read $\cdots(\hat{\boldsymbol{g}}_{s_i}\hat{\boldsymbol{g}}_{t_i}^T + \hat{\boldsymbol{g}}_{t_i}\hat{\boldsymbol{g}}_{s_i}^T)$. The transpose on the 2nd $\hat{\boldsymbol{g}}_{t_i}$ should be removed.
- p. 396, Ex. 9.1: After integrating both sides of this equation over one orbit, and recognizing that the right-hand side computes twice the area A of an ellipse ...
- p. 397, before Eq. (9.70): with the kinetic energy rate expressed as
- p. 397, Eq. (9.72): $\ddot{\mathbf{r}} \cdot \dot{\mathbf{r}} = \cdots = -\frac{\partial V}{\partial r}\dot{r}$
- p. 397, Eq. (9.75): $\frac{1}{2}\dot{\mathbf{r}} \cdot \dot{\mathbf{r}} = \frac{\mu}{r} + \frac{\mu\alpha}{2}$
- p. 397, before Eq. (9.76): For the special case in which $m_2 << m_1$, ...
- p. 384, Table 9.1: Perigree should be Perigee
- p. 398, Eq. (9.78): $v_p^2 = r_p^2\dot{\theta}_p^2 = \frac{r_p^4\dot{\theta}_p^2}{r_p^2}\cdots$
- p. 399, Table 9.2: The μ value of Pluto should be updated to $8.476 \cdot 10^2$ km^3/s^2, about 500 times smaller than Earth's value.
- p. 400, before Eq. (9.84): Sometimes it is convenient ... and $v_\theta = r\dot{\theta}$ respectively.
- p. 405, Eq. (9.95): $\sqrt{\frac{\mu}{p^3}}(t_1 - t_0) = \int_{f_0}^{f_1} \frac{\mathrm{d}f}{(1+e\cos f)^2}$
- p. 408, Eq. (9.107): $\dot{x} = a\sinh(H)\dot{H}$
- p. 408, Eq. (9.108): $\dot{y} = -a\sqrt{e^2-1}\cosh(H)\dot{H}$
- p. 408, Eq. (9.109): $\cdots = \frac{1}{r}\sqrt{\frac{\mu}{-a}}$
- p. 410, after Eq. (9.122): To find the initial mean anomaly M_0, we define $\sqrt{\mu}\sigma = \mathbf{r} \cdot \dot{\mathbf{r}}$, ...
- p. 410, after Eq. (9.125): By making use of the numerical function atan2(x, y), ...
- p. 415, Eq. (9.145): Missing square root here. Should read $i = 2\tan^{-1}\left(\sqrt{Q_1^2 + Q_2^2}\right)$

- p. 419, Eq. (9.180): Should read $F\dot{G} - G\dot{F} = 1$
- p. 421, Ref 7: Broucke, R.A., and Cefola, P.J. ...
- p. 421, Problem 9.4: Verify that Eq. (9.132) is indeed the derivative of Eq. (9.131)
- p. 431–432, Eq2. (10.42–44), (10.48–49), (10.50–51): Need to multiply the right hand side of these equations by the gravitational constant G.
- p. 442, 2nd line after Eq. (10.76): Should read "Think of C as a relative energy measure."
- p. 443, 1st line after Eq. (10.83): Sentence should read "Using Eqs. (10.81) and (10.83) we are ... "
- p. 443, Eq. (10.86): Right hand side should be $\frac{\partial U}{\partial x}$, not $-\frac{\partial U}{\partial x}$. Same for $\frac{\partial U}{\partial y}$ and $\frac{\partial U}{\partial z}$.
- p. 453, Eq. (10.97): The left hand side of this equation should have the $\boldsymbol{a}$ replaced with $\boldsymbol{\Omega}$.
- p. 453, After Eq. (10.97): Make $\boldsymbol{\Omega} = (0, 0, 1)^T$
- p. 454, Eq. (10.101): Replace $\boldsymbol{F}$ with $[F]$. This is equation should yield a 3x3 matrix, not a vector.
- p. 454, Eq. (10.101): The ρ_1^5 term should be ρ_1^3. (first line, in the denominator)
- p. 455, Eq. (10.109): Equation should read $\cdots = -E$
- p. 468, Eq. (11.9): Add the condition "for $k \neq 0$".
- p. 470, Eq. (11.19): Left hand side of this equation should read term 3.
- p. 473, Eq. (11.36): Unclear typesetting, this should read $\cdots = (1-\nu^2)^{\frac{1}{2}j}\cdots$, or simply $\cdots = (1-\nu^2)^{j/2}$
- p. 481, x component of Eq. (11.67) should be identical to the y component: $3\left(35\left(\frac{z}{r}\right) - 210\left(\frac{z}{r}\right)^3 + 231\left(\frac{z}{r}\right)^5\right)\frac{x}{r}$
- p. 487, After Eq. (11.80) change the Table reference from 9.3 to Table 9.2
- p. 487, Table 11.1: Earth sphere of influence should be 925,000 (listed as 916,600)
- p. 487, Table 11.1: Pluto sphere of influence should be 3,120,000 (due to updated value of μ in Table 9.2)
- p. 505, Eq. (12.69): 2nd line of the 3x1 matrix. The $\dfrac{\partial e}{\partial a}$ term should be $\dfrac{\partial E}{\partial a}$
- p. 510, Eq. (12.86c): This equation should read:

$$\frac{\mathrm{d}\omega}{\mathrm{d}t} = \frac{3}{2}J_2 n\frac{a^3}{eb^3}\left(\frac{r_{\text{eq}}}{r}\right)^2\Big[e + \cos f\left(1 + \frac{p}{r}e\cos f\right) + \frac{1}{2}\Big(4e\cos^2 i - 3e(3+\cos 2f)\sin^2 i + \cos f(-3 - e^2 + (3+5e^2)\cos(2i) + 6e^2\sin^2 f\sin^2 i)\Big)\sin^2\theta - \frac{p^2}{r^2}\sin f\sin^2 i\sin(2\theta)\Big]$$

- p. 510, Eq. (12.86e): Last term has the closing bracket off. This equation should read:

$$\frac{\mathrm{d}e}{\mathrm{d}t} = -\frac{3}{2} J_2 n \frac{a^2}{br} \left(\frac{r_{eq}}{r}\right)^2 \Big[\frac{p}{r} \sin f (1 - 3\sin^2\theta \sin^2 i) + (e + \cos f(2 + e\cos f)) \sin(2\theta) \sin^2 i\Big]$$

- p. 510, Eq. (12.86f): This equation should read:

$$\frac{\mathrm{d}M_0}{\mathrm{d}t} = \frac{3}{2} J_2 n \frac{a^2}{eb^2} \left(\frac{r_{\mathrm{eq}}}{r}\right)^2 \Big[(\eta^2 \cos f - \frac{p}{r} e \sin^2 f)(3\sin^2 i \sin^2\theta - 1) + \frac{p^2}{r^2} \sin f \sin^2 i \sin(2\theta)\Big]$$

- p. 512, Eq. (12.95): The term $\dfrac{\partial R}{\partial \boldsymbol{s}}$ should be $\dfrac{\partial R}{\partial \boldsymbol{e}}$

- p. 516, Eq. (12.120): The left hand side of this equation should read $reh\dfrac{\partial f}{\partial \boldsymbol{v}} = \cdots$

- p. 520, Eq. (12.145): The first fraction to the right of the equal sign should be $1/h$. The final equation will read as $\frac{\mathrm{d}e}{\mathrm{d}t} = \frac{1}{h}\Big(\cdots\Big)$

- p. 520, After Eq. (12.145): Change sentence to "After making use of the orbit equation in Eq. (9.6) and the semi-latus rectum relation in Eq. (9.9), the eccentricity … "

- p. 522, Eq. (12.156): Change equation to $\boldsymbol{a} = a_r \hat{\boldsymbol{\imath}}_r + a_\theta \hat{\boldsymbol{\imath}}_\theta + a_h \hat{\boldsymbol{\imath}}_h = a_n \hat{\boldsymbol{\imath}}_n + a_v \hat{\boldsymbol{\imath}}_v + a_h \hat{\boldsymbol{\imath}}_h$

- p. 541, Problem 12.1 In the problem statement, change the equation reference from 11.57 to 11.64.

- p. 542, Problem 12.8 Remove the word "optimal"

- p. 557, Fig 13.7: $\Delta\hat{t} = \alpha\Delta t + (1 - \alpha)\Delta\tilde{t}$

- p. 567, Ex. 13.3: This corresponds to a maximum out-of-plane separation from the original orbit of 97.92<u>km</u>.

- p. 573, Ex. 13.5: The Mars mean orbit rate value should be $n_{♂} = 0.523814$ deg/day

- p. 575, Fig. 13.16 Redrew the transfer orbit to make it more realistic.

- p. 582, Eq. (13.88): $v_2 = \sqrt{2\mu_\odot \left(\frac{1}{r_{♀}} - \frac{1}{r_\oplus}\right) + v_1^2}$

- p. 582, Eq. (13.93): $\nu_2 = \sqrt{v_2^2 + v_{♀}^2 - 2v_2 v_{♀} \cos\sigma_2}$

- p. 584, Eq. (13.100): $e = \sqrt{1 + \frac{d_a^2 \nu_2^4}{\mu_{♂}^2}}$

- p. 588, Eq. (13.109): $v_3 = \sqrt{\nu_3^2 + v_{♀}^2 + 2\nu_3 v_{♀} \cos\theta_3}$

- p. 590, Fig. P13.1 Redrew the transfer orbit to make it more realistic.

- p. 591, Fig. P13.3 Redrew the transfer orbit to make it more realistic.

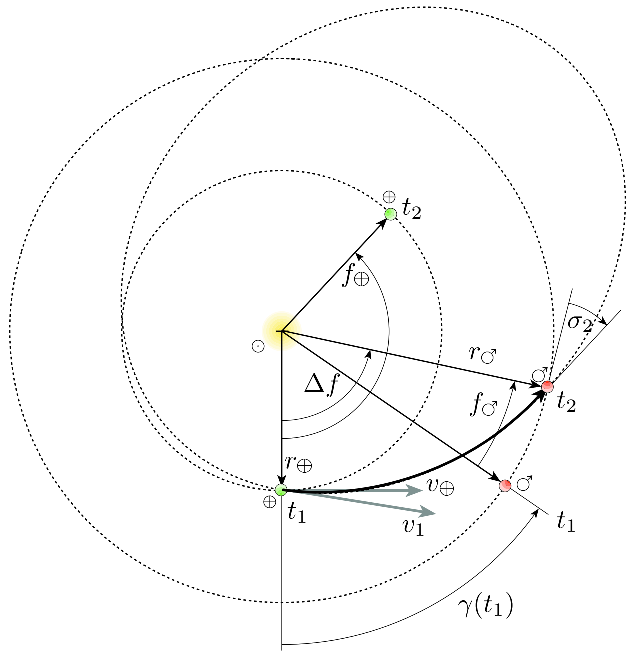

Figure 3: (Fig. 13.16) Non-Minimum Energy Transfer Orbit Illustration between Earth and Mars

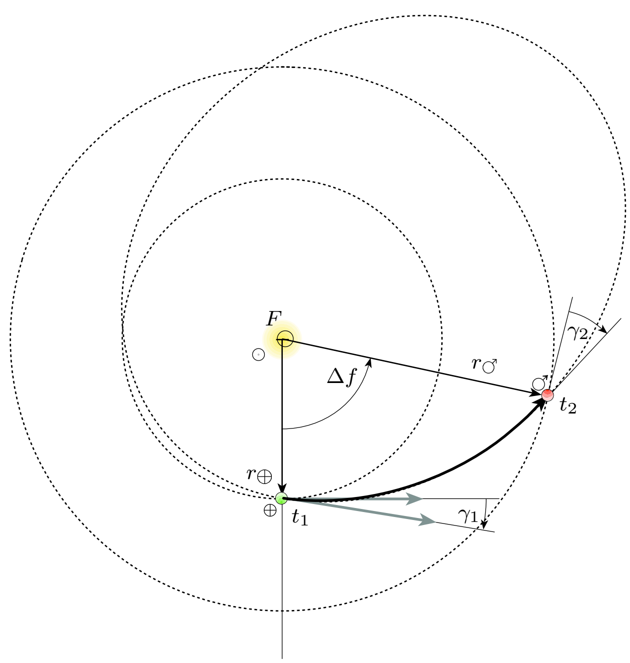

Figure 4: (Fig. P13.1) Earth to Mars Transfer Orbit Illustration

- p. 634, Eq. (14.153): $\delta a = 2Da\delta\eta$

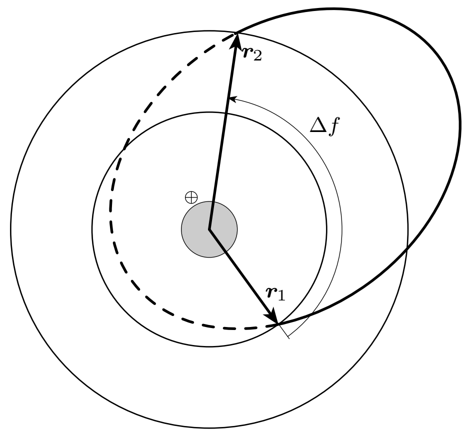

Figure 5: (Fig. P13.3) Earth-Relative Two-Point Boundary value problem

- p. 640, Fig. 14.10(b): Should read $\delta a = 2Da\delta\eta$.
- p. 650, Eq. (14.191): Remove the transpose on the partial derivative matrix $[\partial\boldsymbol{\xi}/\partial\boldsymbol{e}_{\text{osc}}]$.
- p. 664, Eq. (14.245b): $p + 2r_a e = p\frac{1+e}{1-e}$
- p. 667, Eq. (14.259): Second line of this equation should have the $\boldsymbol{x}$ replace with $\boldsymbol{v}$ and read

$$+ \begin{bmatrix} 0 & 2\dot{\theta} & 0 \\ -2\dot{\theta} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \boldsymbol{v} + \cdots$$

- p. 679, 1-2-3 rotation matrix, element (1,3): $-c\theta_3 s\theta_2 c\theta_1 + s\theta_3 s\theta_1$
- p. 688, 3rd line from top:

$$\tan\frac{f}{2} = \sqrt{\frac{e+1}{e-1}}\tanh\frac{H}{2} \qquad \tanh\frac{H}{2} = \sqrt{\frac{e-1}{e+1}}\tan\frac{f}{2}$$

Revision History

- April 6, 2004: Beginning of the revision history section. Added two corrections on page 187.
- April 7, 2004: Added k_Y and k_R switch correction for page 169.
- April 28, 2004: Changed stability condition to squared version in 4.165 on page 169. Adjusted figure label accordingly.
- April 30, 2004: Added brackets around cross product on page 189.
- May 13, 2004: added type setting clarification on page 473.
- July 12, 2004: added entry on page 122.

- July 17, 2004: added entry on page 650 which removes the partial derivative matrix transpose operator.
- Aug. 3, 2004: added Fig. 14.10(b) label correction on page 640
- Aug. 24, 2004: page 276, Eq. (7.57)
- Sept. 3, 2004: page 41, after Eq. (2.37)
- Sept. 13, 2004: page 431–432, multiply specified equations by G.
- Oct. 9, 2004: pages 575, 590, 591. Redrew the transfer orbits to make them more realistic.
- Nov. 10, 2004: pages 399 (Table 9.2) and page 487 (Table 11.1). Updated Pluto values , page 573, update $n_{♂}$ value
- Nov. 11, 2004: pages 487 changed table reference from 9.3 to 9.2
- Dec. 2, 2004: Eq. (13.93) is updated
- Dec. 3, 2004: page 384, Table 1 spelling corrected
- Dec. 31, 2004: corrections on pages 453, 454, 468 and 470 added.
- Jan. 5, 2005: corrections on page 266 (Eqs. 7.6 and 7.7), page 270 (Eq. 7.24), and page 276 (Eq. 7.55) added.
- Jan. 30, 2005: corrections on page 443.
- Feb. 4, 2005: fix on page 421, Problem 4
- Feb. 7, 2005: fix on page 415, Eq. (9.145)
- March 2, 2005: fix on page 454, Eq. (10.101), p. 453, p. 455 with Eq. (10.109)
- March 12, 2005: fix in Eq. (12.69) on page 505, Eq. (12.95) on page 512, Eq. (12.120) on page 516
- March 22, 2005: fix on page 140, page 442
- March 29, 2005: fix on page 355 (Eq. 8.174), page 147 (Fig. 4.7)
- April 6, 2005: fix on page 133, Example 4.1
- April 7, 2005: fix on page 541, Problem 12.1
- April 11, 2005: fix on page 522, Eq. 156.
- April 13, 2005: fix on page 520, Eq. (12.145), and sentence after this equation.
- April 27, 2005: fix on page 542, Prob. 12.8
- May 17, 2005: fix on page 510, Eqs. (12.86c), (12.86.e) and (12.86.f)
- May 18, 2005: fix on page 667, Eq. (14.259)

- May 26, 2005: fix on page 161, Eq. (4.126), page 162 prior to (4.127), page 163 prior to (4.136), page 163 with (4.136), page 163 prior to Eq. (4.137), page 163 with Eq. (4.137), page 164 top of page, page 164 with Eq. (4.138), page 58, page 307 top of page, page 315 Eq. (8.40), page 688