Kleppner & Kolenkow Errata

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This is a list of typos from An Introduction to Mechanics *by Daniel Kleppner and Robert Kolenkow compiled for Physics H7A at UC Berkeley. To reach the compiler, please email Joel Corbo at jcorbo@berkeley.edu. Thanks to all those who have contributed to this list.*

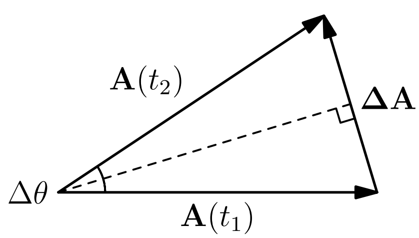
Chapter 1: Vectors and Kinematics

- *Page 17, Example 1.7*

  In the figure at the top of the page, the labels $\mathbf{r}(0)$ and $\mathbf{r}(\mathrm{t})$ on the position vectors have been inverted.

- *Page 26, Section 1.9*

  In the line "Using the angle $\Delta\theta$ defined in the sketch," there is no such sketch. This is my best guess as to what was intended:



- *Page 42, Notes 1.1*

  The first equation in the Taylor's Series section should read:

$$f(x) = a_0 + a_1 x + a_2 x^2 + \cdots = \sum_{k=0}^{\infty} a_k x^k.$$

- *Page 48, Problem 1.13*

  Replace the first sentence of the problem with "At $t = 0$, an elevator departs from the ground with uniform speed."

- *Page 49, Problem 1.19*

  Replace the first sentence of the problem with "A tire of radius R rolls in a straight line without slipping."

Chapter 2: Newton's Laws

- *Page 103, Problem 2.1*

  Replace the second sentence of the problem with, "It starts at rest from the origin at $t = 0$."

- *Page 105, Problem 2.17b*

  The second sentence should begin, "Assuming that $\tan\theta > \mu$," not "Assuming that $\tan\theta < \mu$."

Chapter 3: Momentum

- *Page 129, Example 3.8*

  The very first sentence on the page should be replaced with, "The instantaneous length of the spring is $r_a - r_b = r'_a - r'_b$. The instantaneous departure of the spring from its equilibrium length is $r_a - r_b - l = r'_a - r'_b - l$, where l is the unstretched length of the spring."

- *Page 131, Example 3.9*

  In the last sentence of the second paragraph, replace "If the ball hits a resilient surface" with "If the ball hits a softer surface".

- *Page 137, Section 3.5*

  Towards the bottom of the page, replace the section beginning with "The change in momentum is" and ending with equation 3.18 to:

  The change in momentum is

  $$\begin{aligned}\mathbf{\Delta P} &= \mathbf{P}(t+\Delta t) - \mathbf{P}(t)\\ &= M\mathbf{\Delta v} + (\Delta m)\mathbf{u} + \Delta m\mathbf{\Delta u}\end{aligned}$$

  Therefore,

  $$\begin{aligned}\frac{d\mathbf{P}}{dt} &= \lim_{\Delta t\to 0}\frac{\mathbf{\Delta P}}{\Delta t}\\ &= \lim_{\Delta t\to 0}\left(M\frac{\mathbf{\Delta v}}{\Delta t} + \mathbf{u}\frac{\Delta m}{\Delta t} + \frac{\Delta m\mathbf{\Delta u}}{\Delta t}\right)\\ &= M\frac{d\mathbf{v}}{dt} + \mathbf{u}\frac{dm}{dt}. \qquad 3.18\end{aligned}$$

- *Page 149, Problem 3.17*

  In the answer clue, the weight W should be equal to 8.2 N, not 10 kg.

Chapter 4: Work and Energy

- *Page 157, Example 4.3*

  The left-hand side of the second equation on the page should read "$K(r) - K(R_e)$", not "$K(r) - K(r_e)$".

- *Page 161, Section 4.5*

  The line after equation 4.15 should read, "where $\mathbf{V} = \dot{\mathbf{R}}$ is the velocity of the center of mass."

- *Page 164, Example 4.6*

  About half way down the page, replace each instance of φ with ϕ in the equations after "The work done by gravity is". (Note that these two symbols are different ways to write the Greek letter phi.)

Chapter 5: Some Mathematical Aspects of Force and Energy

- *Page 205, Example 5.2*

  In the equation below "The differential of f is," replace the first dy with dx, producing $df = \frac{\partial(xy)}{\partial x} dx + \frac{\partial(xy)}{\partial y} dy$.

Chapter 6: Angular Momentum and Fixed Axis Rotation

- *Page 237, Example 6.2*

  The last equation on the page should read $\mathbf{L}_A = Mr^2\omega\hat{\mathbf{k}}$.

- *Page 242, Example 6.4*

  The second sentence in the second-to-last paragraph on the page should begin "The total energy $E = K + U$ is".

- *Page 261, Section 6.7*

  The second line of the set of equations after "Eliminating $\mathbf{r}_j$ from Eq. (6.9) gives" should read $\Sigma(\mathbf{R} + \mathbf{r}'_j) \times m_j(\dot{\mathbf{R}} + \dot{\mathbf{r}}'_j)$.

- *Page 276, Note 6.2*

  In the equation following $E = K + U$, the term $\frac{1}{2}l^2\dot{\phi}^2$ should read $\frac{1}{2}ml^2\dot{\phi}^2$.

- *Page 282, Problem 6.23*

  The answer clue should read, "If $A = 2a$, then $\alpha = \frac{3a}{R}$."

Chapter 7: Rigid Body Motion

- *Page 294, Example 7.5*

  About a third of the way down the page, the equations after "The torque is" should read:

$$\begin{aligned}\tau &= \frac{d\mathbf{L}}{dt} \\ &= L\omega\sin\alpha(-\hat{\mathbf{i}}\sin\omega t + \hat{\mathbf{j}}\cos\omega t).\end{aligned}$$

- *Page 336, Problem 7.8b*

  The inequality should read $F \ll \frac{2Mv^2}{b}$, not $F \ll \frac{Mv^2}{b}$.

Chapter 8: Noninertial Systems and Fictitious Forces

- *Page 362, Example 8.8*

  Delete the first instance of the equation "$F_\theta = -2m\dot{r}\Omega$" that appears on this page.

- *Page 371, Note 8.2*

  The equation between equations 3 and 4 should read $\left(\frac{d\mathbf{B}}{dt}\right) = \frac{d}{dt}(B_x\hat{\mathbf{i}} + B_y\hat{\mathbf{j}} + B_z\hat{\mathbf{k}})$.

Chapter 9: Central Force Motion

- *Page 381, Section 9.3*

  In the paragraph after equation 9.11, change the second line to, "to simply as the *effective potential.* U_{eff} differs from the true."

- *Page 383, Section 9.4*

  The sentence just before the end of the section should refer to Eqs. (9.17a and b), not Eqs. (9.16a and b), which do not exist.

- *Page 392, Equation 9.22*

  In equation 9.22, the term $(1-\epsilon^2)x$ should read $(1-\epsilon^2)x^2$

- *Page 394, Example 9.4*

  The equation at the top of the page should be replaced with $\cos\theta_a = \frac{1}{\epsilon}$.

- *Page 396, Example 9.5*

  In the line after "Knowing A, we can find E from Eq. (9.26):", change the equation after the word "or" to $E = -\frac{C}{A}$.

- *Page 406, Problem 9.3*

  Replace the last sentence of the problem with, "Find θ as a function of r for motion with uniform radial velocity v."

Chapter 10: The Harmonic Oscillator

- *Page 419, Example 10.2*

  At the end of the first set of calculations, the result should be approximately 7000, not approximately 700.

- *Page 427, Section 10.3*

  The last sentence before the plot should read "γ is given in units of s^{-1}."

- *Page 438, Problem 10.3*

  In the figure accompanying this problem, replace the symbol φ with ϕ.