Page 433, Exercise 6 (b). The error on page 429 is repeated here. The expression C needs to have the factor e^2 added:

$$C = \frac{3e^2\mu^3}{2J^4}\cos 2\theta.$$

Page 442, under the index item *divergence*: the *divergence of a tensor* is defined on page 373, not 372. There are other index items with page ranges that should end on 373, not 372.

The following errors in the first edition have been corrected in the second printing (August 2001).

Page 27. The displayed formulas for τ and for E at the top of the page are wrong. They should be

$$\tau = \frac{t - vz}{\sqrt{1-v^2}},$$
$$E(t,z) = \mathcal{E}\left(\frac{t - vz}{\sqrt{1-v^2}}, \frac{z - vt}{\sqrt{1-v^2}}\right).$$

Page 28. Exercise 5. The formula for $E(t,z)$ must be changed as on page 27.

Page 89, line +8. Add the word "does": "the total momentum does not change over time:"

Page 137. Replace all the text from Proposition 3.4 up to, but not including, Definition 3.7 by the following.

It is evident that the left-hand side—and thus the right—has the dimensions of a rate of change of energy with respect to time. The following proposition will lead us to a physical interpretation for $\mathbf{f}\cdot\mathbf{v}$.

Proposition 3.4 *If $\widetilde{K}(t) = \frac{1}{2}\mu v^2(t)$ is the classical kinetic energy of G in R's frame and $\tilde{\mathbf{f}} = \mu\mathbf{a}$ is the classical 3-force acting on G, then*

$$\frac{d\widetilde{K}}{dt} = \tilde{\mathbf{f}}\cdot\mathbf{v}.$$

PROOF: Since $v^2 = \mathbf{v}\cdot\mathbf{v}$, we can write $\widetilde{K}(t) = \dfrac{\mu}{2}\mathbf{v}\cdot\mathbf{v}$. Therefore,

$$\frac{d\widetilde{K}}{dt} = \frac{\mu}{2}(\mathbf{v}\cdot\mathbf{v})' = \frac{\mu}{2}(2\,\mathbf{v}'\cdot\mathbf{v}) = \mu\mathbf{v}'\cdot\mathbf{v} = \mu\mathbf{a}\cdot\mathbf{v} = \tilde{\mathbf{f}}\cdot\mathbf{v}.$$ END OF PROOF

Let us therefore interpret $\mathbf{f}\cdot\mathbf{v}$ (which involves the *relativistic* 3-force $\mathbf{f}$) as the time rate of change of *relativistic* kinetic energy K of G in R's frame. Thus $\mathbb{F}\cdot\mathbb{U} = 0$ becomes

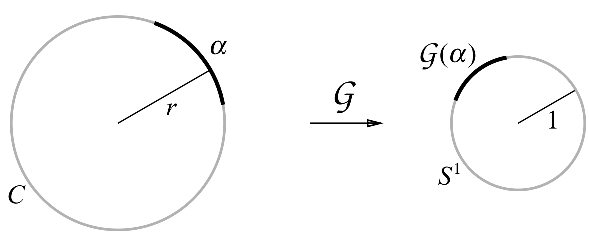
$$c^2\,\frac{dm}{dt} = \frac{dK}{dt}, \quad \text{implying} \quad c^2 m = K + \text{const}.$$

If we further require that $K = 0$ when $v = 0$, as in the classical case, then we can determine the constant of integration in the last equation: Since $m = \mu$ and $K = 0$ when $v = 0$, it follows that const $= \mu c^2$, the rest energy of G. We can summarize the previous discussion in the following definition and corollary.

Page 138, line 4. Insert between "K" and the colon:
"We also have an expression for the relativistic kinetic energy K that agrees with the one we used in section 3.1 for non-accelerated motion:"

Page 190, line -4. Insert the sentence: "…$hN = h\nu - h\nu\Delta\Phi$. (For the rest of this paragraph, h represents Planck's constant, not the position of C.) If we let…".

Page 244. In the figure, the Gauss image $\mathcal{G}(\alpha)$ in S^1 is incorrect; it should be rotated 90° counterclockwise, as in the figure below.



Page 268. The statement about the normal component $\mathbf{N}$ of acceleration (and the formula given in line -4) are incorrect, as is the displayed formula immediately above that line. The displayed formula and the sentence following it should read

$$\left(\frac{d^2q^k}{dt^2} + \Gamma^k_{ij}\frac{dq^i}{dt}\frac{dq^j}{dt}\right)\mathbf{x}_k + b_{ij}\frac{dq^i}{dt}\frac{dq^j}{dt}\mathbf{n}.$$

The last term is the normal component $\mathbf{N}$ of acceleration. It depends on the second fundamental form b_{ij} and the velocity components dq^i/dt of the curve $\mathbf{z}(t)$, but is in general different from zero.

Page 375, line -1. Add a space between "δ_k^h" and "is".

Page 382. In exercise 9 (c), two minus signs are missing. The statement should read:
Assume $T_{ij} \equiv 0$ and show that $R = -4\Lambda$ where R is the scalar curvature function $R = R_i^i$. Then show that $R_{ij} = -\Lambda g_{ij}$.

Page 431, The paragraph "Visualizing the drift" states incorrectly the size of the drift due to the other planets. Replace the paragraph with the following.

In fact, most of the shift is due to the fact that the observations are made in a non-inertial frame; only about one-tenth is due to the Newtonian gravitational "disturbances by other planets." The relativistic contribution is extremely small; even over 80 centuries it amounts to just under 1°, but it is enough to be visible in the figure on the next page. By contrast, the observed shift during the same time is enormous—a third of a complete revolution. The figure is drawn to scale and gives an accurate picture of the eccentricity of Mercury's orbit. The non-relativistic contribution (of about $5557''$ per century) is shown by the dashed ellipse, the correct (relativistic) drift by the gray ellipse.