Issue 1

Page 5, first paragraph.

the mantissa be “normalized” (i.e., have magnitude in the range [1.0, 10.0]).

Fix

A normalized mantissa can be up to but not including 10.0.

the mantissa be “normalized” (i.e., have magnitude in the range [1.0, 10.0]).

— Sundaram Ramaswamy

Issue 2

Page 51, figure 2.13, length of the projection.

\[\frac{\|v\| \cos(\theta)}{\|w\|}\]

Fix

\[v \cdot w / \|w\| = \|v\| \|w\| \cos(\theta) / \|w\| = \|v\| \cos(\theta)\]

— Sundaram Ramaswamy
Issue 3

Page 117, second paragraph.

There is a single solution only if the rank of \( A \) is equal to the minimum of the number of rows or columns of \( A \).

Fix

There is a single solution only if the rank of the coefficient matrix equals the number of unknowns in the equation i.e. there should be no free variables, which is given by unknowns – rank; otherwise the system becomes underdetermined or overdetermined. If the above statement were true, a system with 3 unknowns and a \( 2 \times 3 \) coefficient matrix of rank 2 would’ve a single solution while such an underdetermined system would have no or infinite solutions due to that one free variable.

— Jacob Shields

Issue 4

Page 126, second paragraph under §3.6.3

The first part of the determinant sum is \( u_{0,0} \tilde{U}_{0,0} \). […]

\[
det(U) = u_{0,0} \tilde{U}_{0,0}
\]

Fix

The determinant of a real matrix is a (real) scalar, not another matrix. In both cases it should be

\[
det(U) = u_{0,0} \det(\tilde{U}_{0,0})
\]

— Jacob Shields

Issue 5

Page 130, second paragraph.

It turns out that the columns of \( \mathbf{R} \) are the eigenvectors of \( \mathbf{A} \), and the diagonal elements of \( \mathbf{D} \) are the corresponding eigenvectors.
Fix

It turns out that the columns of $R$ are the eigenvectors of $A$, and the diagonal elements of $D$ are the corresponding eigenvalues.

— Jacob Shields

Issue 6

Page 178, §5.3.3 Concatenation

Applying $(\pi/2, \pi/2, \pi/2)$ twice doesn’t end up at the same orientation as $(\pi, \pi, \pi)$.

Fix

Applying $(\pi/4, \pi/4, \pi/4)$ twice doesn’t end up at the same orientation as $(\pi/2, \pi/2, \pi/2)$.

— Jacob Shields

Issue 7

Page 181, last sentence.

Near-parallel vectors may cause us some problems either because the dot product is near 0, or normalizing the cross product ends up dividing by a near-zero value.

Fix

Near-parallel vectors may cause us some problems either because the cross product results in a 0 vector, or normalizing the cross product may lead to division by a near-zero value. The dot product should be near 1, but through floating point error, may result in a magnitude slightly greater than 1, which is not valid input to $\text{acos}$.

— Jacob Shields
**Issue 8**

**Page 191**, equation 5.7.

\[ \hat{q} = (2 \cos \theta + 2, 2 \sin \theta \hat{r}) \]

Fix

\[ q = (2 \cos \theta + 2, 2 \sin \theta \hat{r}) \]

— Jacob Shields

**Issue 9**

**Page 191**, below the third equation.

we just need to compute \((w_1 + w_2)/2\)

Fix

we just need to compute \((w_0 + w_1)/2\)

— Jacob Shields

**Issue 10**

**Page 198**, second equation.

\[ R_q(p) = \left( 2 \cos^2 \left( \frac{\theta}{2} \right) - 1 \right) p + \left( \hat{r} \sin \left( \frac{\theta}{2} \right) \cdot p \right) \hat{r} \sin \left( \frac{\theta}{2} \right) + 2 \cos \left( \frac{\theta}{2} \right) \left( \hat{r} \sin \left( \frac{\theta}{2} \right) \times p \right) \]

Fix

\[ R_q(p) = \left( 2 \cos^2 \left( \frac{\theta}{2} \right) - 1 \right) p + 2 \left( \hat{r} \sin \left( \frac{\theta}{2} \right) \cdot p \right) \hat{r} \sin \left( \frac{\theta}{2} \right) + 2 \cos \left( \frac{\theta}{2} \right) \left( \hat{r} \sin \left( \frac{\theta}{2} \right) \times p \right) \]

— Salih
Issue 11

Page 250, equation of $x_v$ and the first equation in the following page.

$$x_v = \frac{2a}{w_x} (x_s - s_x) - 1$$

$$\begin{bmatrix} x_v \\ y_v \\ z_v \end{bmatrix} = \begin{bmatrix} \frac{2a}{w_x} & 0 & -\frac{2a}{s_x} \\ 0 & -\frac{1}{h_x} & \frac{2}{h_x}s_y + 1 \\ 0 & 0 & -d \end{bmatrix} \begin{bmatrix} x_s \\ y_s \\ 1 \end{bmatrix}$$

Fix

The whole thing should be multiplied by the aspect ratio, which results in

$$x_v = \frac{2a}{w_x} (x_s - s_x) - a$$

$$\begin{bmatrix} x_v \\ y_v \\ z_v \end{bmatrix} = \begin{bmatrix} \frac{2a}{w_x} & 0 & -\frac{2a}{s_x} - a \\ 0 & -\frac{1}{h_x} & \frac{2}{h_x}s_y + 1 \\ 0 & 0 & -d \end{bmatrix} \begin{bmatrix} x_s \\ y_s \\ 1 \end{bmatrix}$$

— Aapo Laitinen

Issue 12

Page 636, second paragraph.

Each object will have its own value of epsilon. […]

Following page, equation 13.18 contains a term $\epsilon_a$, and below it is written

The equation for $j_b$ is similar, except that we substitute $\epsilon_{b,0}$ for $\epsilon_{a,0}$.

The code on page 638 follows this by referring to `m_Elasticity` and `other->m_Elasticity`. 
Fix

These assertions are incorrect. The coefficient of restitution is not a property of an individual object — it is a property of the collision itself. This can be seen clearly in equation 13.15, which applies to both objects. So if we are considering four materials A, B, C, and D, there would be six possible coefficients of restitution: A colliding with B, A colliding with C, A colliding with D, B colliding with C, B colliding with D, and C colliding with D.

— James McGovern

Issue 13

Page 639, the moments of inertia tensors used in the collision response equations are referred to as $I_a$ and $I_b$.

Fix

These should be $J_a$ and $J_b$ to match the previous notation used. The intent of this was to separate the notation for the identity matrix from the notation for the inertia tensor. However, standard convention is to use $I$ for the inertia tensor, hence the typo.

— Johnny Newman