

Thomas Haslwanter

3D-Kinematics

– Errata –

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Rotation Matrices

Eq. (3.35) on p. 48 should read

$$\begin{aligned}\phi_N &= -\arcsin\left(\frac{p_z}{\sqrt{p_x^2+p_y^2+p_z^2}}\right) \\ \theta_N &= \arcsin\left(\frac{p_y}{\sqrt{p_x^2+p_y^2+p_z^2}} \cdot \frac{1}{\cos\phi_N}\right).\end{aligned}$$

Quaternions and Gibbs Vectors

on p. 60, towards the end of line 4 there should be a space before "And"

Analysis of 3D Movement Recordings

The chapter **6.2.2 Position in Space / Initial Orientation** should start out with

As mentioned in Sec. 2.2.2, accelerometers measure the gravito-inertial acceleration, ...

Appendix: Mathematical Basics

Eq. (A.3) on p. 116 should read

$$\tilde{\mathbf{u}} \circ \tilde{\mathbf{v}} = (\mathbf{u} \cdot \mathbf{v}) * (-1) + (\mathbf{u} \times \mathbf{v}) \cdot \mathbf{I}.$$

Appendix: Python and Matlab

p. 130, *Matlab*: In *Matlab 2018a* the function `normalize` was introduced. So to make the toolbox compatible with new *Matlab* versions, the function `normalize` was renamed to `normalize_vector` (see Table 0.1)

List of Programs

group	Python	Matlab
quat	Quaternion (class) calc_angvel calc_quat convert deg2quat q_conj q_inv q_mult q_scalar q_vector quat2deg quat2seq unit_q	@quat(class) calc_angvel calc_quat quat_convert deg2quat q_conj q_inv q_mult q_scalar q_vector quat2deg quat2seq unit_q
rotmat	convert dh dh_s R R_s seq2quat sequence	rotmat_convert dh dh_s R R_s seq2quat sequence
imus	IMU_Base (class) analytical kalman Mahony Madgwick	— analyze_imus imu_Kalman @MahonyAHRS(class) @MadgwickAHRS(class) imu_Madgwick, or imu_Mahony
markers	analyze_3Dmarkers find_trajectory	analyze_3Dmarkers find_trajectory
vector	angle GramSchmidt normalize project plane_orientation q_shortest_rotation rotate_vector target2orient	vector_angle GramSchmidt normalize_vector project_vector plane_orientation q_shortest_rotation rotate_vector target2orient
view	orientation ts	view_orientation view_ts
utility	— (in numpy) — (in numpy) (in Class IMU) — (in numpy) — (in scipy) — (in numpy)	copysign deg2rad get_XSens rad2deg savgol toRow

Table 0.1 Python and Matlab functions provided with this book.