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3D-Kinematics

– Errata –

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3.6.1 Two DOF - Targeting an Object in 3-D

p. 48: Eq. (3.35) should read

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

4.3.1 Background

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

4.5.2 Orientation of 3-D Acceleration Sensor

p. 70: The code-line

```
q_adjust = skin.vector.qrotate(g, g_rotated)
```

has to be replaced with

```
q_adjust = skin.vector.qrotate(g, g_upright)
```

6.2.2 Position in Space

p. 93: The chapter **Initial Orientation** should start out with

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

A.1.2 Cross Product

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

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

C.2 Vector Calculations

p. 134: **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 C.1)

List of Programs

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

Table 0.1 Python and Matlab functions provided with this book.