Notation

	– General Notation –
a	This font is used for real scalars
$\boldsymbol{a}$	This font is used for real column vectors
$\boldsymbol{A}$	This font is used for real matrices
X	This font is used for sets
$\mathbf{I}$	The identity matrix
$\mathbf{0}$	The zero matrix
$\boldsymbol{A}^\top$	The transpose of matrix $\boldsymbol{A}$
$\mathbb{R}^{M\times N}$	The vector space of real $M \times N$ matrices
$p(\boldsymbol{a})$	The probability density of $\boldsymbol{a}$
$p(\boldsymbol{a}\vert\boldsymbol{b})$	The probability density of $\boldsymbol{a}$ given $\boldsymbol{b}$
$\mathcal{N}(\boldsymbol{\mu}, \boldsymbol{\Sigma})$	Gaussian probability density with mean $\boldsymbol{\mu}$ and covariance $\boldsymbol{\Sigma}$
$\mathcal{GP}(\boldsymbol{\mu}(t), \boldsymbol{\mathcal{K}}(t,t'))$	Gaussian process with mean function, $\boldsymbol{\mu}(t)$, and covariance function, $\boldsymbol{\mathcal{K}}(t,t')$
$\hat{(\cdot)}$	A posterior (estimated) quantity
$\check{(\cdot)}$	A prior quantity
$(\cdot)_k$	The value of a quantity at timestep k
$(\cdot)_{k_1:k_2}$	The set of values of a quantity from timestep k_1 to timestep k_2, inclusive
$\Vert\cdot\Vert_1$	L1 norm $\Vert\boldsymbol{x}\Vert_1 = \sum \vert x_i\vert$
$\Vert\cdot\Vert_2$	L2 norm $\Vert\boldsymbol{x}\Vert_2 = \sqrt{\sum x_i^2}$

– 3D Geometry Notation –

$\mathcal{F}^a$	A reference frame in three dimensions
$\boldsymbol{v}^a$	The coordinates of a vector in frame $\mathcal{F}^a$
$\boldsymbol{R}_a^b$	A 3×3 rotation matrix (member of SO(3)) that takes points expressed in $\mathcal{F}^a$ and re-expresses them in (purely rotated) $\mathcal{F}^b$: $\boldsymbol{v}^b = \boldsymbol{R}_a^b \boldsymbol{v}^a$
$\boldsymbol{t}_a^b$	The three-dimensional position of the origin of frame $\mathcal{F}^a$ expressed in $\mathcal{F}^b$
$\tilde{\boldsymbol{v}}^a = \begin{bmatrix} \boldsymbol{v}^a \\ 1 \end{bmatrix}$	A 4×1 homogeneous point expressed in $\mathcal{F}^a$
$\boldsymbol{T}_a^b = \begin{bmatrix} \boldsymbol{R}_a^b & \boldsymbol{t}_a^b \\ \boldsymbol{0} & 1 \end{bmatrix}$	A 4×4 transformation matrix (member of SE(3)) that takes homogeneous points expressed in $\mathcal{F}^a$ and re-expresses them in (rotated and translated) $\mathcal{F}^b$: $\tilde{\boldsymbol{v}}^b = \boldsymbol{T}_a^b \tilde{\boldsymbol{v}}^a$
SO(3)	The special orthogonal group, a matrix Lie group used to represent rotations
so(3)	The Lie algebra associated with SO(3)
SE(3)	The special Euclidean group, a matrix Lie group used to represent poses
se(3)	The Lie algebra associated with SE(3)
$(\cdot)^\wedge$	An operator mapping a vector in $\mathbb{R}^3$ (resp. $\mathbb{R}^6$) to an element of the Lie algebra for rotations (resp. poses); implements the cross product for three-dimensional quantities, *i.e.*, for two vectors $\boldsymbol{u}, \boldsymbol{v} \in \mathbb{R}^3$, $\boldsymbol{u}^\wedge \boldsymbol{v} = \boldsymbol{u} \times \boldsymbol{v}$
$(\cdot)^\vee$	An operator mapping an element of the Lie algebra for rotations (resp. poses) to a vector in $\mathbb{R}^3$ (resp. $\mathbb{R}^6$)