Notation

General

Quantity	Notation	Subscript		Superscript	Example
		Left	Right		
Scalar	lowercase	n/a	n/a	n/a	$a = 4$
Vector	lowercase, bold	frame	from → to	n/a	${}_{\mathcal{A}}\boldsymbol{r}_{AB}$
Unit axis vector	lowercase, bold	frame	axis	frame of axis	${}_{\mathcal{A}}\boldsymbol{e}_{x}^{\mathcal{B}}$
Homogeneous vector	lowercase, bold, tilde	frame	from → to	n/a	${}_{\mathcal{A}}\tilde{\boldsymbol{r}}_{AB}$
Matrix	uppercase, bold	n/a	n/a	n/a	$\boldsymbol{A}$
Transformations[1]	uppercase, bold	n/a	to ← from	n/a	$\boldsymbol{R}_{\mathcal{B}\mathcal{A}}$

[1] This includes passive rotation matrices, homogeneous transformations, quaternions

$f(\boldsymbol{x};\boldsymbol{p})$ a quantity f with variables $\boldsymbol{x}$ and (optionally) parameterized by parameters $\boldsymbol{p}$.

Kinematics

Quantity	Notation	Subscript
Absolute[1] position	$\boldsymbol{r}_P := {}_{\mathcal{I}}\boldsymbol{r}_{IP}$	object (point)
Absolute velocity	$\boldsymbol{v}_P := {}_{\mathcal{I}}\dot{\boldsymbol{r}}_{IP}$	object (point)
Absolute acceleration	$\boldsymbol{a}_P := \dot{\boldsymbol{v}}_P = {}_{\mathcal{I}}\ddot{\boldsymbol{r}}_{IP}$	object (point)

[1] relative to a fixed (inertial) reference frame $\mathcal{I}$ with origin I

Probability

Property	Notation
Random variable (RV), state	X, x
Probability	$P(X = x) =: P(X)$
Conditional probability	$P(X = x \vert Y = y) =: P(X \vert Y)$
Expectation of a continuous RV	$\mathbb{E}_{x \sim f(x)}[X] = \int_{-\infty}^{\infty} x \ f(x) \ dx =: \mathbb{E}[X] =: \mu$
Expectation of a discrete RV	$\mathbb{E}_{x \sim p(x)}[X] = \sum_i x_i \ p(x_i) =: \mathbb{E}[X] =: \mu$
Expectation (continuous RV) of a function g	$\mathbb{E}_{x \sim f(x)}[g(x)] = \int_{-\infty}^{\infty} g(x) f(x) \ dx$
Expectation (discrete RV) of a function g	$\mathbb{E}_{x \sim p(x)}[g(x)] = \sum_i g(x_i) p(x_i)$
Variance	$\mathrm{Var}[X] =: \sigma^2$
Standard deviation	$\mathrm{SD}[X] =: \sigma$
Probability mass function[1]	$p_X(x) =: p(x)$
Probability density function[2]	$f_X(x) =: f(x)$
Cumulative distribution function	$F_X(x) =: F(x)$

[1] for discrete RVs [2] for continuous RVs