Notation

Symbol	Meaning
$t,\ \rho$	t time, ρ density
$\pi,\ e,\ i$	$\pi \approx 3.14159265358979323846$ $e \approx 2.71828182845904523536$ $i \triangleq \sqrt{-1}$
$g,\ G$	Gravitational constants. Earth: $g \approx 9.80665\ \frac{\text{m}}{\text{s}^2}$ Universal: $G \approx 6.673 \times 10^{-11}\ \frac{\text{m}^3}{\text{kg s}^2}$
$\mu_s,\ \mu_k,\ e_r$	Coefficient of static and kinetic friction. Coefficient of restitution.
$\frac{\partial y}{\partial x}\ \frac{\partial^2 y}{\partial x^2}$	First, second partial derivative of the scalar y with respect to the scalar x.
$\frac{dy}{dt},\ \dot{y},\ y'$	Ordinary time derivative of y.
$\frac{d^2y}{dt^2},\ \ddot{y},\ y''$	Second ordinary time derivative of y.
$\int_{\bar{t}=0}^{t} y(\bar{t})\, d\bar{t}$	Definite integral of $y(\bar{t})$ from $\bar{t}=0$ to $\bar{t}=t$
Vectors and dyadics	
$\vec{\mathbf{v}}$	Vector $\vec{\mathbf{v}}$ (bold-faced font)
$\vec{\mathbf{0}}$	Zero vector (bold-faced font)
$\lvert\vec{\mathbf{v}}\rvert$	Magnitude of vector $\vec{\mathbf{v}}$. $\lvert\vec{\mathbf{v}}\rvert = (\vec{\mathbf{v}} \cdot \vec{\mathbf{v}})^{1/2} = \sqrt{\vec{\mathbf{v}} \cdot \vec{\mathbf{v}}}$
$\vec{\mathbf{v}}^n$	Vector $\vec{\mathbf{v}}$ raised to the n power. $\vec{\mathbf{v}}^n \triangleq \lvert\vec{\mathbf{v}}\rvert^n = (\vec{\mathbf{v}} \cdot \vec{\mathbf{v}})^{\frac{n}{2}}$, e.g., $\vec{\mathbf{v}}^2 \triangleq \lvert\vec{\mathbf{v}}\rvert^2 = \vec{\mathbf{v}} \cdot \vec{\mathbf{v}}$
$[\vec{\mathbf{v}}]_b$	3×1 matrix representation of the vector $\vec{\mathbf{v}}$ expressed in the b basis. Similarly, $\left[\vec{\vec{\mathbf{D}}}\right]_b$ is the 3×3 matrix representation of the dyadic $\vec{\vec{\mathbf{D}}}$ expressed in the b basis.
$\begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}_b$	3×1 matrix representation of the vector $2\,\hat{\mathbf{b}}_\text{x} + 3\,\hat{\mathbf{b}}_\text{y} + 4\,\hat{\mathbf{b}}_\text{z}$ Similarly, $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}_b$ represents dyadic $1\,\hat{\mathbf{b}}_\text{x}\hat{\mathbf{b}}_\text{x} + 2\,\hat{\mathbf{b}}_\text{x}\hat{\mathbf{b}}_\text{y} + 3\,\hat{\mathbf{b}}_\text{x}\hat{\mathbf{b}}_\text{z} + 4\,\hat{\mathbf{b}}_\text{y}\hat{\mathbf{b}}_\text{x} + 5\,\hat{\mathbf{b}}_\text{y}\hat{\mathbf{b}}_\text{y} \ldots$
$\vec{\vec{\mathbf{D}}}$	Dyadic $\vec{\vec{\mathbf{D}}}$ (bold-faced font)
$\vec{\vec{\mathbf{0}}},\ \vec{\vec{\mathbf{1}}}$	Zero dyadic, unit dyadic
$\vec{\mathbf{a}} \times \vec{\mathbf{b}}$	Cross product of vector $\vec{\mathbf{a}}$ with vector $\vec{\mathbf{b}}$
$\vec{\mathbf{a}} \cdot \vec{\mathbf{b}}$	Dot product of vector $\vec{\mathbf{a}}$ with vector $\vec{\mathbf{b}}$
$\frac{^N\partial\vec{\mathbf{v}}}{\partial x}$	Partial derivative in reference frame N of the vector $\vec{\mathbf{v}}$ with respect to x
$\frac{^Nd\vec{\mathbf{v}}}{dt}$	Ordinary time derivative in reference frame N of the vector $\vec{\mathbf{v}}$
$\frac{^Nd^2\vec{\mathbf{v}}}{dt^2}$	Second ordinary time derivative in reference frame N of the vector $\vec{\mathbf{v}}$
$\vec{\boldsymbol{\nabla}}f$	Gradient of scalar function f (results in a vector)
Mass, center of mass, inertia	
S_cm	The subscript cm denotes the mass center of a body or system S
m^S	Mass of S (S is a particle, body, or system of particles and bodies)
$\vec{\vec{\mathbf{I}}}^{S/O}$	Inertia dyadic of S about point O (S is a particle, body, or system of particles and bodies)
$\left[\text{I}^{S/O}\right]_b$	Inertia matrix of S about point O for the b basis
$\vec{\mathbf{I}}^{S/O}_{\hat{\mathbf{v}}}$	Inertia vector of S about point O for the unit vector $\hat{\mathbf{v}}$
$\text{I}^{S/O}_{\hat{\mathbf{u}}\,\hat{\mathbf{v}}}$	Inertia scalar (moment or product) of S about point O for the unit vectors $\hat{\mathbf{u}}$ and $\hat{\mathbf{v}}$

Symbol	Meaning
Rotational kinematics	
${}^{\mathrm{a}}R^{\mathrm{b}}$	Rotation matrix relating the right-handed orthogonal unit vectors $\widehat{\mathbf{a}}_{\mathrm{x}}$, $\widehat{\mathbf{a}}_{\mathrm{y}}$, $\widehat{\mathbf{a}}_{\mathrm{z}}$ to the right-handed orthogonal unit vectors $\widehat{\mathbf{b}}_{\mathrm{x}}$, $\widehat{\mathbf{b}}_{\mathrm{y}}$, $\widehat{\mathbf{b}}_{\mathrm{z}}$.
${}^{N}\vec{\boldsymbol{\omega}}^{B}$	Angular velocity of reference frame B in reference frame N
${}^{N}\vec{\boldsymbol{\alpha}}^{B}$	Angular acceleration of reference frame B in reference frame N
Translational kinematics	
$\vec{\mathbf{r}}^{Q/O}$	Position vector of point Q from point O
${}^{N}\vec{\mathbf{v}}^{Q}$	Velocity of point Q in reference frame N
${}^{N}\vec{\mathbf{v}}^{Q/R}$	Velocity of point Q relative to point R in reference frame N (${}^{N}\vec{\mathbf{v}}^{Q/R} = {}^{N}\vec{\mathbf{v}}^{Q} - {}^{N}\vec{\mathbf{v}}^{R}$)
${}^{N}\vec{\mathbf{a}}^{Q}$	Acceleration of point Q in reference frame N
Momentum, inertia force, kinetic energy in a reference frame N	
${}^{N}\vec{\mathrm{L}}^{S}$	Translational momentum of S in reference frame N (S is a particle, body, or massive system)
${}^{N}\vec{\mathrm{H}}^{S/O}$	Angular momentum of S about point O in reference frame N (S is a massive system)
${}^{N}\mathrm{L}^{S}_{u_r}$	Generalized momentum of S in reference frame N for the generalized speed u_r
${}^{N}\vec{\mathbf{F}}^{S}$	Effective force ($m\,\vec{\mathbf{a}}$) of S in N (S is a particle, body, or system of particles and bodies)
${}^{N}\vec{\mathbf{M}}^{S/O}$	Moment of effective forces ($\vec{\mathbf{r}} \times m\,\vec{\mathbf{a}}$) of S about point O in reference frame N
${}^{N}\mathcal{F}^{S}_{u_r}$	Generalized effective force of S in reference frame N for the generalized speed u_r
${}^{N}K^{S}$	Kinetic energy of S in reference frame N (S is a particle, body, or massive system)
${}^{N}\mathcal{L}^{S}$	Lagrangian of S in reference frame N
Forces, moments, torque	
$\vec{\mathbf{F}}^{Q/R}$	Force on point Q by point R
$\vec{\mathbf{F}}^{S}$	Resultant of forces on the point, particle, body, or system S
$\vec{\mathbf{M}}^{S/O}$	Moment of the set S of bound vectors about point O
$\vec{\mathbf{T}}^{A}$	Torque of the couple associated with the replacement of forces on rigid object A
$\vec{\mathbf{T}}^{A/B}$	Torque of the couple associated with forces on rigid object A by rigid object B
Power, work, potential energy, and generalized force in a reference frame N	
${}^{N}\mathrm{P}^{\vec{\mathbf{F}}^{Q/R}}$	Power due to the force on point Q by point R
${}^{N}\mathrm{P}^{S}$	Power due to all the forces on point, body, or system S and S's motion in N
${}^{N}\mathrm{W}^{S}$	Work due to all forces on point, body, or system S and S's motion in N
${}^{N}U^{\vec{\mathbf{F}}^{Q}}$	Potential energy due to force on point Q and Q's position in N
${}^{N}U^{S}$	Potential energy due to all forces on system S and S's configuration in N
$\mathcal{F}^{Q}_{u_r}$	Generalized force (implied Newtonian reference frame) associated with force $\vec{\mathbf{F}}^{Q}$ and generalized speed u_r. Similarly, $\mathcal{F}^{Q/R}_{u_r}$ is generalized force for force $\vec{\mathbf{F}}^{Q/R}$.
Current, voltage, electrical elements	
i, v	current, voltage Note: $j \triangleq \sqrt{-1}$ when i is electrical current.
R, C, L	resistance, capacitance, inductance