Notation

Symbol	Meaning
π	3.14159265358979323846 ...
e	2.71828182845904523536 ...
t	Time
ρ	Density
g	Earth's gravitational constant $g \approx 9.80665$ m/s^2
G	Universal gravitational constant $G \approx 6.673 \times 10^{-11}$ m^3/(kg$*$s^2)
μ_s, μ_k	Coefficient of static and kinetic friction
e_r	Coefficient of restitution
$\frac{\partial y}{\partial x}$	Partial derivative of the scalar y with respect to the scalar x
$\frac{\partial^2 y}{\partial x^2}$	Second partial derivative of the scalar y with respect to the scalar x
$\frac{dy}{dt}$, $\dot{y}$, y'	Ordinary time derivative of y
$\frac{d^2 y}{dt^2}$, $\ddot{y}$, y''	Second ordinary time derivative of y
Vectors and dyadics	
$\vec{\mathbf{v}}$	Vector $\vec{\mathbf{v}}$ (bold-faced font)
$\vec{\mathbf{0}}$	Zero vector (bold-faced font)
$\left\vert\vec{\mathbf{v}}\right\vert$	Magnitude of vector $\vec{\mathbf{v}}$. $\left\vert\vec{\mathbf{v}}\right\vert = (\vec{\mathbf{v}} \cdot \vec{\mathbf{v}})^{1/2} = \sqrt{\vec{\mathbf{v}} \cdot \vec{\mathbf{v}}}$
$\vec{\mathbf{v}}^n$	Vector $\vec{\mathbf{v}}$ raised to the n power. $\vec{\mathbf{v}}^n \triangleq \left\vert\vec{\mathbf{v}}\right\vert^n = (\vec{\mathbf{v}} \cdot \vec{\mathbf{v}})^{\frac{n}{2}}$, e.g., $\vec{\mathbf{v}}^2 \triangleq \left\vert\vec{\mathbf{v}}\right\vert^2 = \vec{\mathbf{v}} \cdot \vec{\mathbf{v}}$
$\overrightarrow{\overrightarrow{\mathbf{D}}}$	Dyadic $\overrightarrow{\overrightarrow{\mathbf{D}}}$ (bold-faced font)
$\overrightarrow{\overrightarrow{\mathbf{0}}}$, $\overrightarrow{\overrightarrow{\mathbf{1}}}$	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 $\vec{\mathbf{b}}$
$\frac{^N d\vec{\mathbf{v}}}{dt}$	Ordinary time derivative in reference frame N of the vector $\vec{\mathbf{v}}$
$\frac{^N d^2\vec{\mathbf{v}}}{dt^2}$	Second ordinary time derivative in reference frame N of the vector $\vec{\mathbf{v}}$
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)
$\overrightarrow{\overrightarrow{\mathbf{I}}}^{S/O}$	Inertia dyadic of S about point O (S is a particle, body, or system of particles and bodies)
$\mathrm{I}^{S/O}_{\hat{\mathbf{u}}\,\hat{\mathbf{v}}}$	Inertia scalar (moment or product) of S about point O for the unit vectors $\hat{\mathbf{u}}$ and $\hat{\mathbf{v}}$
Rotational kinematics	
$^{\text{a}}R^{\text{b}}$	Rotation matrix relating the right-handed orthogonal unit vectors $\hat{\mathbf{a}}_{\text{x}}$, $\hat{\mathbf{a}}_{\text{y}}$, $\hat{\mathbf{a}}_{\text{z}}$ to the right-handed orthogonal unit vectors $\hat{\mathbf{b}}_{\text{x}}$, $\hat{\mathbf{b}}_{\text{y}}$, $\hat{\mathbf{b}}_{\text{z}}$
$^N\vec{\boldsymbol{\omega}}^B$	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
$^N\vec{\mathbf{a}}^Q$	Acceleration of point Q in reference frame N

Momentum, inertia force, kinetic energy in a reference frame N	
${}^N\vec{\mathbf{L}}^S$	Linear momentum of S in reference frame N (S is a particle, body, or massive system)
${}^N\vec{\mathbf{H}}^{S/O}$	Angular momentum of S about point O in reference frame N (S is a massive system)
${}^NK^S$	Kinetic energy of S in reference frame N (S is a particle, body, or massive system)
Forces, moments, torque, impulse	
$\vec{\mathbf{F}}^{Q/R}$	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
$\vec{\mathbf{J}}^{Q/R}$	Impulse on point Q by point R
$\vec{\mathbf{J}}^S$	Resultant of impulses on the point, particle, body, or system S
$\vec{\mathbf{t}}^A$	Torque of the couple associated with the replacement of impulses on rigid object A
$\vec{\mathbf{t}}^{A/B}$	Torque of the couple associated with impulses on rigid object A by rigid object B
Power, work, and potential energy in a reference frame N	
${}^N\mathrm{P}^{\vec{\mathbf{F}}^{Q/R}}$	Power due to the force on point Q by point R and the velocity of Q relative to R in N
${}^N\mathrm{P}^S$	Power due to all the forces on point, body, or system S and the motion of S in N
${}^N\mathrm{W}^{\vec{\mathbf{T}}^A}$	Work due to the torque on rigid object A and the angular velocity of A in N
${}^N\mathrm{W}^S$	Work due to all forces on point, body, or system S and the motion of S in N
${}^NU^{\vec{\mathbf{F}}^Q}$	Potential energy due to the force on point Q and the position of Q in N
${}^NU^S$	Potential energy due to all forces on system S and the configuration of S in N