Parallel Equations of Motion

RA Gillmann, 2023-04-07	Displacement & Time	Dischronment & Stance	Angle & Arc Length	Angle & Arc Duration
Stance / Distance | Time / Distime	Displacement: $\mathbf{x}$; distance x Independent time: t	Dischronment: $\mathbf{z}$; distime z Independent stance: s	Angle length: $\boldsymbol{\theta} = \mathbf{s}/r$ Arc length: s	Angle duration: $\boldsymbol{\varphi} = \mathbf{t}/q$ Arc duration: t
Radius | Period	Length radius $r = \mathrm{S}/(2\pi) = qv$	Duration radius $q = \mathrm{T}/(2\pi) = rw$	Angular velocity $\boldsymbol{\omega} = \boldsymbol{\varphi}/t = \boldsymbol{\kappa}/w = 2\pi f = 2\pi/\mathrm{T}$ $= d\boldsymbol{\theta}/dt = \mathbf{v}_\perp/r = 1/q$	Wavenumber (angular lenticity) $\boldsymbol{\kappa} = \boldsymbol{\theta}/s = \boldsymbol{\omega}/v = 2\pi h = 2\pi/\lambda$ $= d\boldsymbol{\theta}/ds = \mathbf{w}_\perp/q = 1/r$
Velocity | Lenticity | Wavenumber	Cross/Tangential velocity $\mathbf{v}_\perp = d\mathbf{x}/dt = \mathbf{r}\times\boldsymbol{\omega} = r/q = \mathrm{S/T}$	Cross/Tangential lenticity $\mathbf{u}_\perp = d\mathbf{z}/ds = \mathbf{q}\times\boldsymbol{\kappa} = q/r = \mathrm{T/S}$		
Acceleration | Relentation	Radial acceleration $a_\parallel = v^2/r = r\omega^2 = v/q = r/q^2$	Radial relentation $b_\parallel = w^2/q = q\kappa^2 = w/r = q/r^2$	Angular acceleration $\boldsymbol{\alpha} = d\boldsymbol{\omega}/dt = \mathbf{a}\mathrm{T}/r$	Angular relentation $\boldsymbol{\beta} = d\boldsymbol{\kappa}/ds = \mathbf{b}\mathrm{T}/q$
	Tangential acceleration $\mathbf{a}_\perp = \boldsymbol{\omega}\times\mathbf{v} = \mathrm{T}d\mathbf{v}/dt = r\boldsymbol{\alpha}$	Tangential relentation $\mathbf{b}_\perp = \mathrm{T}d\mathbf{w}/ds = q\boldsymbol{\beta}$		
Wavelength | Period	$\lambda = \mathrm{S} = 2\pi r = 2\pi vq$	$\mathrm{T} = 2\pi q = 2\pi wr$	$\lambda = \mathrm{S} = 2\pi/\kappa = 1/h$	$\mathrm{T} = 2\pi/\omega = 1/f$
Revolutions | Repetitions Frequency | Circuncy	Revolutions $N = \theta/(2\pi)$	Repetitions $Z = \varphi/(2\pi)$	Period frequency $f = \omega/(2\pi) = 1/\mathrm{T}$	Length frequency (circuncy) $h = \kappa/(2\pi) = 1/\lambda$
Constant Velocity | Lenticity	$\mathbf{x} = \mathbf{x}_0 + \mathbf{v}t$	$\mathbf{z} = \mathbf{z}_0 + \mathbf{w}s$	$\boldsymbol{\theta} = \boldsymbol{\theta}_0 + \boldsymbol{\omega}t$	$\boldsymbol{\varphi} = \boldsymbol{\varphi}_0 + \boldsymbol{\kappa}s$
First Equation of Motion	$\mathbf{v} = \mathbf{v}_0 + \mathbf{a}t$	$\mathbf{w} = \mathbf{w}_0 + \mathbf{b}s$	$\boldsymbol{\omega} = \boldsymbol{\omega}_0 + \boldsymbol{\alpha}t$	$\boldsymbol{\kappa} = \boldsymbol{\kappa}_0 + \boldsymbol{\beta}s$
Second Equation of Motion	$\mathbf{x} = \mathbf{x}_0 + \mathbf{v}_0 t + \tfrac{1}{2}\mathbf{a}t^2$	$\mathbf{z} = \mathbf{z}_0 + \mathbf{w}_0 x + \tfrac{1}{2}\mathbf{b}s^2$	$\boldsymbol{\theta} = \boldsymbol{\theta}_0 + \boldsymbol{\omega}_0 t + \tfrac{1}{2}\boldsymbol{\alpha}t^2$	$\boldsymbol{\varphi} = \boldsymbol{\varphi}_0 + \boldsymbol{\kappa}_0 t + \tfrac{1}{2}\boldsymbol{\beta}s^2$
Third Equation of Motion	$\mathbf{v}^2 = \mathbf{v}_0{}^2 + 2\mathbf{a}\cdot(\mathbf{x} - \mathbf{x}_0)$	$\mathbf{w}^2 = \mathbf{w}_0{}^2 + 2\mathbf{b}\cdot(\mathbf{z} - \mathbf{z}_0)$	$\boldsymbol{\omega}^2 = \boldsymbol{\omega}_0{}^2 + 2\boldsymbol{\alpha}\cdot(\boldsymbol{\theta} - \boldsymbol{\theta}_0)$	$\boldsymbol{\kappa}^2 = \boldsymbol{\kappa}_0{}^2 + 2\boldsymbol{\beta}\cdot(\boldsymbol{\varphi} - \boldsymbol{\varphi}_0)$
Inertia | Facilia	Mass, linear inertia: $m = 1/n$	Vass, linear facilia: $n = 1/m$	Angular inertia: $I = mr^2$	Angular facilia: $J = nq^2$
Momentum | Levamentum	Momentum: $\mathbf{p} = m\mathbf{v}$	Levamentum: $\mathbf{q} = n\mathbf{w}$	Angular momentum: $\mathbf{L} = I\boldsymbol{\omega}$	Angular levamentum: $\boldsymbol{\Gamma} = J\boldsymbol{\kappa}$
Kinetic Energy and Lethargy	Kinetic energy: $E_K = \tfrac{1}{2}mv^2$	Kinetic lethargy: $L_K = \tfrac{1}{2}nw^2$	Angular energy $E_A = \tfrac{1}{2}I\omega^2$	Angular lethargy $L_A = \tfrac{1}{2}J\kappa^2$
Newton's Second Law	Force: $\mathbf{F} = m\mathbf{a} = d\mathbf{p}/dt$	Release: $\mathbf{R} = n\mathbf{b} = d\mathbf{q}/ds$	Torque: $\boldsymbol{\tau} = I\boldsymbol{\alpha} = \mathbf{s}\times\mathbf{F}$	Strophence: $\boldsymbol{\sigma} = J\boldsymbol{\beta} = \mathbf{t}\times\mathbf{R}$
Work | Repose	Linear work: $W = \mathbf{F}\cdot\mathbf{x}$	Linear repose: $Y = \mathbf{R}\cdot\mathbf{z}$	Angular work: $W = \boldsymbol{\tau}\cdot\boldsymbol{\theta}$	Angular repose: $Y = \boldsymbol{\sigma}\cdot\boldsymbol{\varphi}$
Power | Placidity	Linear power: $P = \mathbf{F}\cdot\mathbf{v}$	Linear placidity: $Z = \mathbf{R}\cdot\mathbf{w}$	Angular power: $P = \boldsymbol{\tau}\cdot\boldsymbol{\omega}$	Angular placidity: $Z = \boldsymbol{\sigma}\cdot\boldsymbol{\kappa}$