Variable	Description
β_{xT}	Parameter for asymmetric motion
δx	Relative horizontal blade excursion
$\delta x_w(z)$	Local horizontal wave excursion
Δt	Time step
Δx_w	Average horizontal wave excursion along length of kelp
ΔF	Parameter for ratio of top drag force and bottom drag force
γ	Ratio of frond length to wavelength
λ	Wavelength
ρ_k	Density of kelp
ρ_w	Density of seawater
θ	Angle of deflection from the vertical
ω	Wave frequency
a	Area per unit length
A	Maximal projected area of a frond
A_c	Cross-sectional area of a stipe
A_w	Wave amplitude
B	Buoyancy parameter
C_a	Added mass coefficient
C_d	Drag coefficient
$C_{d,f}$	Reduced drag coefficient
Ca	Cauchy number
d	Thickness of a plate
E	Modulus of elasticity
$\mathbf{e}_s$	Unit vector in direction of segment
$\mathbf{F}_{AM}$	Added mass force
$\mathbf{F}_B$	Buoyant force
$\mathbf{F}_D$	Drag force
F_D	Horizontal drag force
$F_{D,Rig}$	Rigid drag force

$F_{D,top}$	Top drag force
$F_{D,bot}$	Bottom drag force
$\mathbf{F}_P$	Pressure gradient force
$\mathbf{F}_T$	Tension force
$\mathbf{g}$	Gravitational acceleration vector
H	Depth of water column
H_s	Wave height
I	Second moment of area
k	Wavenumber
KC	Keulegan-Carpenter number
l	Frond length
l_e	Effective length
L	Ratio of blade length to wave excursion
M_A	Average mass per unit area
m_k	Effective mass of each segment
n	Number of segments
P	Ca/B
r_s	Radius of stipe
T_p	Wave period
$\mathbf{u} = (u_x, u_z)$	Fluid velocity
u_k	X-component of the kelp tip velocity
u_{rel}	Normalized relative velocity
U_w	Characteristic wave orbital velocity scale
V	Estimated volume of a frond
$\mathbf{x} = (x, z)$	Position vector of each point mass
$\bar{z}$	Mean vertical position of each segment over one wave cycle
$\mathbf{x}_i$	Denotes ith segment of kelp model
$*$	Denotes dimensionless and of order unity