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Avi Uzi, Avi Levy

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Ben Gurion University of the Negev, Department of Mechanical Engineering

Nomenclature

Symbol	Description	Units
C	Volume fraction	[-]
C_v	Local particle concentration, i.e. volume fraction	[-]
C_{vd}	Delivered particle concentration	[-]
C_{vi}	In-situ particle concentration	[-]
d	Particle diameter	[m]
D	Pipe diameter	[m]
dx	differential axial distance	[m]
e_n	Normal coefficient of restitution	[-]
E	Young modulus	[Pa]
F	Force	[N]
g	Gravity	[ms ⁻²]
i_m	Pressure gradient in height of water/length of pipe	[-]
I	Moment of inertia	[kgm ²]
j_m	Pressure gradient in height of mixture/length of pipe	[-]
k	Turbulent kinetic energy	[m ² s ⁻²]
k_n	Normal stiffness coefficient	[kgs ⁻² m ^{-1/2}]
k_t	Tangential stiffness coefficient	[kgs ⁻²]
m_p	Particle mass	[kg]
\hat{n}	Normal unit vector	[-]
P	Pressure	[Pa]
Q	Volumetric flux	[m ³ s ⁻¹]
r	Particle radius	[m]
R	Distance from center of mass to contact point	[m]
t	time	[s]
T	Torque	[Nm]
v	Velocity	[ms ⁻¹]
v'	Fluctuate velocity from the mean flow	[ms ⁻¹]
V	Volume	[m ³]
δ	Displacement distance	[m]
ε	Turbulent dissipation	[m ² s ⁻³]
η	Damping coefficient	[kgs ⁻¹]

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