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A = cross-sectional area of channel

A_{bank} = cross-sectional area of bank region

$A^*_{bank} = \dfrac{A_{bank}}{D_c^2}$ = dimensionless cross-sectional area of bank region

A_{bed} = cross-sectional area of flat-bed region

$$A_1 = \left(\frac{dD^*}{dy^*}\right)^2 + 1$$

$$A_2 = \frac{D^*}{A_1}\frac{d^2D^*}{dy^{*2}}$$

$$A_3 = \frac{30D^*A_1^{0.5}}{k^*}$$

$$A_4 = \ln(A_3)$$

$$A_5 = (A_2+1)A_1^{0.5}\frac{dD^*}{dy^*}$$

$$A_6 = \left((1-2A_2)\frac{dD^*}{dy^*}\frac{d^2D^*}{dy^{*2}} + D^*\frac{d^3D^*}{dy^{*3}}\right)\Big/A_1$$

$$A_7 = \mu^2 - r^2 + 1$$

$$A_8 = \frac{A_7}{A_1} + r^2 - 1$$

$$A_9 = \frac{r\mu}{A_1^{1.5}} - \frac{A_7}{A_1^2A_8^{0..5}}$$

$$A_{10} = 1 + \frac{1}{2A_4 - \frac{17}{3}}$$

$$A_{11} = (2+A_2)^2A_1$$

$$A_{12} = A_{10}\left\{\frac{4-A_2}{24(A_2+2)}\left(\frac{A_5}{A_3}\right)\left(\frac{30}{k^*}\right) + \left(\frac{5}{36} - \frac{A_4}{4}\right)\frac{(1-2A_2)}{A_{11}}\frac{dD^*}{dy^*}\frac{d^2D^*}{dy^{*2}}\right\}$$

B = top channel width

$B^* = \dfrac{B}{D_c}$; dimensionless top channel width

B_f = flat-bed channel width

$B_f^* = \dfrac{B_f}{D_c}$; dimensionless flat-bed width

B_s = total width of the two curving bank regions

$\mathrm{B}_s^* = \dfrac{\mathrm{B}_s}{\mathrm{D}_c}$; dimensionless bank width

$$C = \frac{(4 - A_2)}{24(A_2 + 2)}\left(\frac{A_5}{A_3}\right)\left(\frac{30}{k^*}\right) + \left(\tfrac{5}{36} - A_4\right)\left(\frac{A_6}{36(A_2 + 2)^2}\right)$$

c = temporally averaged sediment concentration
$c|_{z=D}$ = near-bottom suspended sediment concentration
D = local depth

$\mathrm{D}^* = \dfrac{\mathrm{D}}{\mathrm{D}_c}$; dimensionless vertical depth

D_c = depth at center of channel
D_n = normal channel depth

$$D_{3a} = \frac{d^*}{yD^{*2}} - \left(\frac{(y'_1 + A_{12})}{y} + \frac{dD^*}{dy^*}\frac{(A_2 + 2)}{D^*}\right)\frac{dd^*}{dy^*} - \frac{A_1^{0.5}}{yD^*}\left(1 + \tfrac{1}{2}A_2\right)$$

$$D_{3b} = \left\{2\left(\frac{dD^*}{dy^*}\frac{d^2D^*}{dy^{*2}}\right)^2\left(\frac{1.5rm}{A_1^{2.5}} + A_7\left(\frac{A_7}{2A_8^{1.5}A_1^4} - \frac{2}{A_8^{0.5}A_1^3}\right)\right) - A_9\left(\frac{d^2D^*}{dy^{*2}}\right)^2\right\}\frac{d^*_{cr}}{(1-r)m}$$

$$D_{3c} = \frac{A_9 d^*_{cr}}{(1-r)m}\frac{dD^*}{dy^*} + \left(\tfrac{5}{36} - \frac{A_4}{4}\right)\left(\frac{A_{10}D^*}{A_{11}y}\frac{dd^*}{dy^*}\right)$$

$\overline{D} = \dfrac{A_{bank}}{B_s}$ = mean depth of bank region

d = y - B_f/2 = lateral distance from junction point
d^* = d/D_c = dimensionless lateral distance from junction point
d_{90} = the grain sizes such that 90% of the sediment is finer
d_{50} = the grain sizes such that 50% of the sediment is finer
d_{50}^* = d_{50}/D_c; dimensionless grain size such that 50% of the sediment is finer
D = deposition rate

$$E = \frac{p}{2}\left(1 - \sin^2 f\right)$$

E = erosion rate
f^* = correction factor
F_L = vertically integrated lateral volumetric transport of suspended sediment
g = acceleration due to gravity

$$j = -D_n \frac{d^2D}{dy^2} \Bigg/ \left(1 + \left(\frac{dD}{dy}\right)^2\right)^{1.5}$$

k = equivalent sand grain roughness

$\mathrm{k}^* = \dfrac{\mathrm{k}}{\mathrm{D}_c}$; dimensionless equivalent sand grain roughness

$k_1 = -1.85\sqrt{\frac{g}{R_s^3 d_{50}}} S^2 D_c$

$k_2 = -0.001\sqrt{\frac{g}{R_s^3 d_{50}^3}} \frac{(SD_c)^2}{v_s^*}$

$k_3 = \frac{R_s g d_{50} v_s^{*2}}{e_z}$

n = roughness coefficient

P = wetted perimeter of channel

P_{bank} = wetted perimeter of bank region

Q = water discharge rate of channel

Q_{bank} = bank water discharge rate

Q_{bank}^* = dimensionless bank water discharge rate

Q_f = water discharge rate for flat-bed region

Q_s = sediment discharge rate

q_B = longitudinal bed load rate per unit width

q_{BL} = lateral bed load rate per longitudinal length

$R_s = (\rho_s - \rho)/\rho$; submerged specific gravity of sediment

$r = \mu\beta$

S = longitudinal channel slope

U = mean downstream velocity

u = mean velocity over flat-bed region

u' = fluctuating downstream velocity

$\bar{u}$ = mean velocity based on mean depth of bank region

$u_{*c} = \sqrt{\tau_c/\rho}$; friction velocity corresponding to the shear stress at the center of the channel τ_c

$u_{*G} = \sqrt{\tau_G/\rho}$ = friction velocity corresponding to grain shear stress τ_G

V = mean cross-sectional velocity

v' = fluctuating cross-sectional velocity

v_s = settling velocity of the suspended sediment

$v_s^* = v_s \big/ \sqrt{R_s g d_{50}}$

$x^* = y^* - y_j^* + \Delta^*/2$; dimensionless distance from center of delta function interval

y = lateral distance from center of channel

$y^* = \frac{y}{D_c}$; dimensionless lateral distance from center of channel

y_j^* = lateral distance of junction point from center of channel

z = normal distance from channel bed

α_1 = correction factor

α_2 = coefficient in equation 31; bank cross-sectional area

α_3 = coefficient in equation 33; bank cross-sectional area

β = lift-to-drag ratio
Δ^* = delta function interval
Δy^* = step size
$\delta = \tau/\rho g S$; stress depth
$\delta^* = \frac{\delta}{D_c}$; dimensionless stress-depth
d^*_{ave} = average dimensionless stress-depth over the flat-bed region
δ_{cr} = critical bed stress depth
δ_{crb} = critical stress depth at a point on the bank
$\delta^*_{cr} = \frac{\delta_{cr}}{D_c}$; dimensionless critical bed stress depth
$\delta^*_{crb} = \frac{\delta_{crb}}{D_c}$; dimensionless critical stress depth at a point on the bank
$d^*_{cr\,\max}$ = upper limit of d^*_{cr} range for a given value of μ
$d^*_{cr\,\min}$ = lower limit of d^*_{cr} range for a given value of μ
ε_y = lateral sediment diffusivity induced by fluid turbulence
ε_z = vertical sediment diffusivity
μ = submerged coefficient of friction of channel material
$z = \int_0^D c\,dz$ = vertically integrated suspended sediment concentration
ρ = mass density of water
ρ_s = mass density of sediment
σ_g = gradation coefficient
τ = shear stress acting on the channel boundary
τ^* = dimensionless total shear stress
t^*_{ave} = average dimensionless shear stress over the flat-bed region
$\tau^*_{cr} = \delta_{cr} S/R_s d_{50}$; dimensionless critical shear stress
τ_G = grain shear stress
$\tau^*_G = \tau_G/\rho R_s g d_{50}$; dimensionless grain shear stress
ϕ = angle of repose

$$y = \left(\frac{4+j}{24(2-j)}\ln\left(30\frac{D_n}{k}\right) - \frac{5}{36(2-j)}\right)\left(1+\frac{1}{2\ln(30D_n/k)-\frac{17}{3}}\right)$$

$$y_1 = \frac{10-3A_4(4-A_2)}{36(A_2+2)(2A_4-\frac{17}{3})^2}\left(\frac{A_5}{A_3}\right)\left(\frac{30}{k^*}\right)$$

$$\psi_0 = \left(\tfrac{1}{12}\ln\left(\frac{30}{k^*}\right)-\tfrac{5}{72}\right)\left(1+\frac{1}{2\ln(30/k^*)-\frac{17}{3}}\right)$$