1 Hydraulic variables

$$H = S - B$$
$$S = H + B$$
$$B = S - H$$
$$M = \sqrt{U^2 + V^2}$$
$$I = H \times U$$
$$J = H \times V$$
$$Q = \sqrt{I^2 + J^2}$$
$$C = \sqrt{g\,H}$$
$$F = \frac{M}{C}$$

2 Sediment transport variables

$$\mathrm{HD} = B - \mathrm{RB}$$
$$B = \mathrm{HD} - \mathrm{RB}$$
$$\mathrm{RB} = B - \mathrm{HD}$$
$$\mathrm{QS} = \sqrt{\mathrm{QSX}^2 + \mathrm{QSY}^2}$$
$$\mathrm{QS} = \mathrm{EF} + \mathrm{DF}$$
$$\mathrm{QSBL} = \sqrt{\mathrm{QSBLX}^2 + \mathrm{QSBLY}^2}$$
$$\mathrm{QSSUSP} = \sqrt{\mathrm{QSSUSPX}^2 + \mathrm{QSSUSPY}^2}$$

3 Friction velocity

$$\mathrm{US} = \sqrt{\frac{1}{2}\,C_f\,M^2}$$

3.1 Chézy

$$C_f = \frac{2g}{C^2}$$

3.2 Strickler

$$C_f = \frac{2g}{K^2 h^{1/3}}$$

3.3 Manning

$$C_f = \frac{2gm^2}{h^{1/3}}$$

3.4 Nikuradse

$$C_f = \frac{2\kappa^2}{\left[\log\left(\frac{30}{e^1}\frac{h}{k_S}\right)\right]^2}$$

4 Bed shear stress, Rouse number and diameter

$$\tau = \rho\,\mathrm{US}^2$$
$$R_0 = \frac{w_s}{\kappa\,\mathrm{US}}$$
$$\mathrm{DMAX} = \begin{cases} 1.4593 \times \tau^{0.979} & \text{if } \tau > 3.4 \\ 1.2912 \times \tau^2 + 1.3572\tau - 0.1154 & \text{if } 0.1 < \tau \leqslant 0.34 \\ 0.9055 \times \tau^{1.3178} & \text{if } \tau \leqslant 0.1 \end{cases}$$