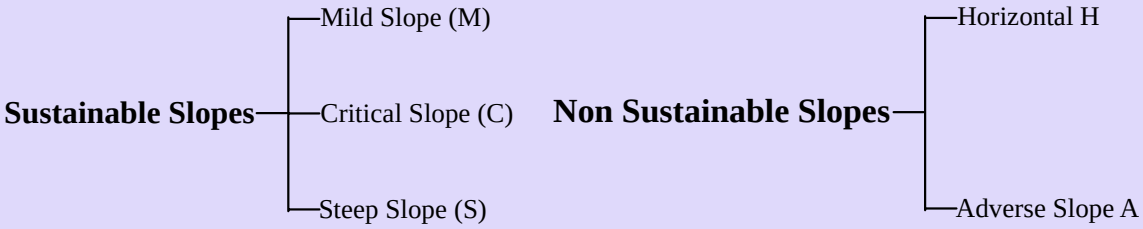
18.3 The channel- bed slopes may be classified into the following five categories



The slope that can uniform flow is called sustainable slopes. The mild slope sustains sub critical $(F_r < 1)$ uniform flow, denoted as M. The critical slope sustains uniform flow at critical depth $(F_r = 1)$ denoted as C. steep slope sustain the supercritical uniform flow $(F_r > 1)$ denoted as S.

When the slope is zero (Horizontal) then

$$\overline{V} = \frac{1}{n} R^{2/3} \sqrt{S_o} = zero$$

$$Q = \overline{V} y_n \qquad \therefore y_n \to \infty \quad indicated\ as\ y_n^*$$

$$\overline{V} = \frac{1}{n} R^{2/3} \sqrt{S_o}$$

Thus y_n is imaginary or negative (from chezy's equation).

Slopes are also classified as

- Sustaining slope
  - (i) Mild — always subcritical uniform flow is sustained F<1
  - (ii) Critical — always sustains critical uniform flow F=1
  - (iii) Steep — always sustains super critical uniform flow F>1

- Non-Sustaining slope
  - (i) Horizontal — Normal depth $y_n^* \rightarrow \infty$
  - (ii) Adverse

- Slope
  - Positive slope — $S_o = -\frac{dz}{dx}$

  - Negative slope — $S_o = \frac{dz}{dx}$

Energy slope	$S_e = \frac{dH}{dx}$
Friction slope	$S_f = \frac{dh_f}{dx}$
Bed slope	$S_0 = \frac{dz}{dx}$
Water surface slope	$S_w = \frac{dy}{dx}$