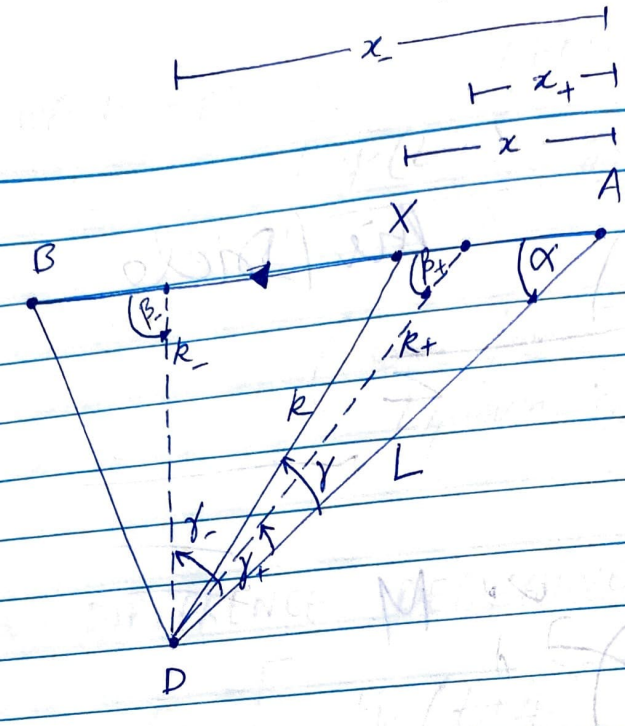
HORIZONTAL / GENERAL



$$x_c = \frac{c^2 L\cos\alpha - v^2 L\cos\alpha \pm \sqrt{-c^4 L^2 \sin^2\alpha + c^2 L^2 v^2 \sin^2\alpha}}{(c^2 - v^2)}$$

OR

$$L\cos\alpha \mp \frac{cL\sin\alpha}{\sqrt{v^2 - c^2}}$$

$$x_\pm = \frac{\left(c^2 t_t v - Lv\cos\alpha\right) \pm \sqrt{v^2\left(-L^2 v^2 + c^2 L^2 + c^2 t_t^2 v^2 - 2c^2 L t_t v\cos\alpha + L^2 v^2\cos^2\alpha\right)}}{c^2 - v^2}$$

$$V_\pm = c^2 v \pm \frac{c^2 v^3 (t_t v - L\cos\alpha)}{\sqrt{v^2\left(-L^2 v^2 + c^2 L^2 + c^2 t_t^2 v^2 - 2c^2 L t_t v\cos\alpha + L^2 v^2\cos^2\alpha\right)}}$$

$$c^2 - v^2$$

$$t_1 = \frac{x}{v}$$

$$t_2 = \frac{k}{c} \quad \text{or} \quad \frac{\sqrt{k^2 + x^2 - 2Lx\cos\alpha}}{c}$$

$$t_t = t_1 + t_2$$

$$k_{\pm} = \sqrt{L^2 + x_{\pm}^2 - 2Lx_{\pm}\cos\alpha}$$

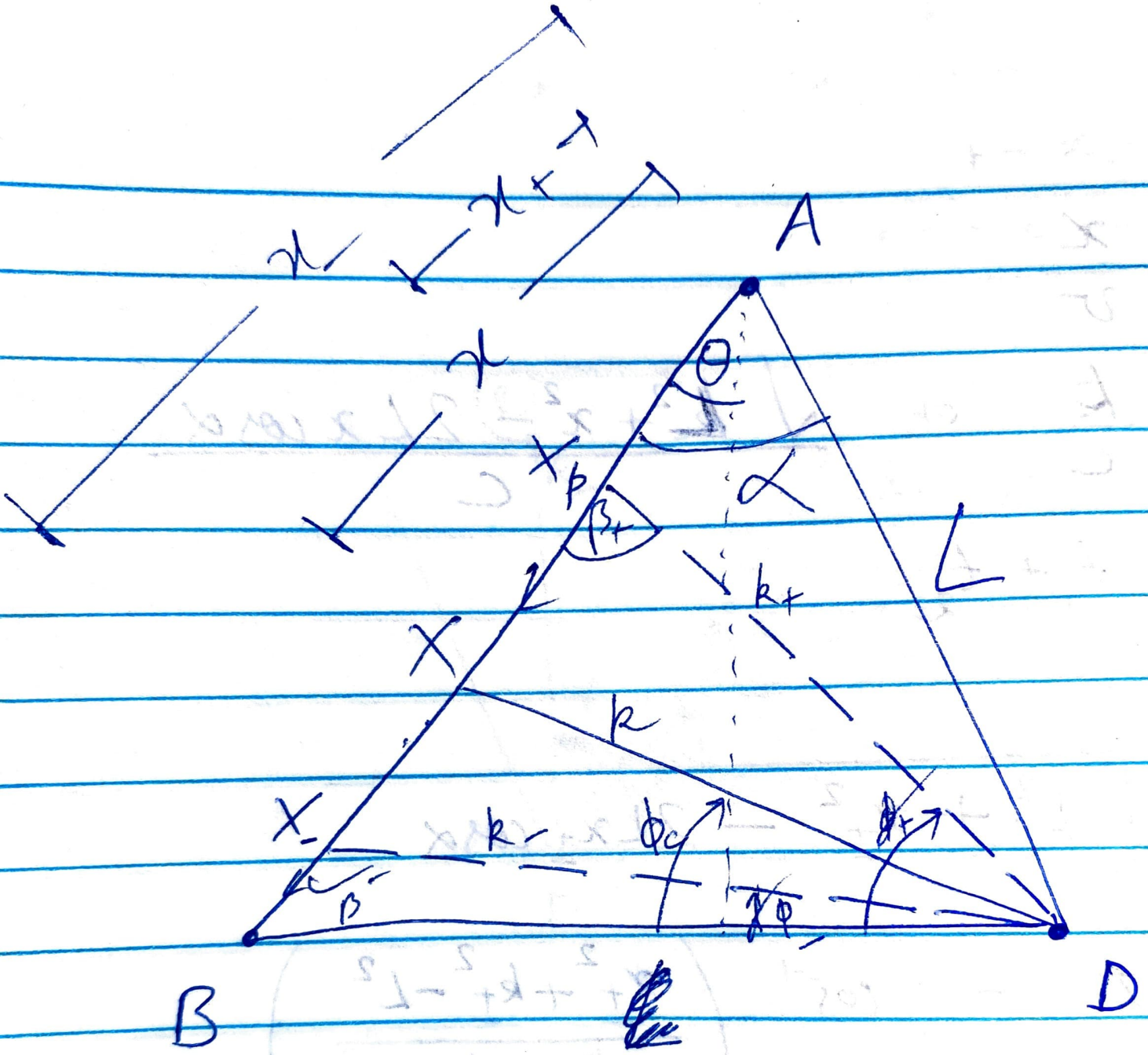
$$\beta_{\pm} = \pi - \cos^{-1}\left(\frac{x_{\pm}^2 + k_{\pm}^2 - L^2}{2x_{\pm}k_{\pm}}\right)$$

$$V_{\pm t} = V_{\pm}\sin(\beta_{\pm})$$

$$\dot{\theta}_{\pm} = \frac{V_{\pm t}}{k_{\pm}}$$

$$B_{\pm} = \text{abs}\left(\frac{\dot{\theta}_{\pm}}{k_{\pm}^2}\right)$$

$$\gamma_{\pm} = \cos^{-1}\left(\frac{L^2 + k_{\pm}^2 - x_{\pm}^2}{2Lk_{\pm}}\right)$$



$$Z_{\pm} = \left(n_{AB} - x_{\pm}\right) \cos\theta$$