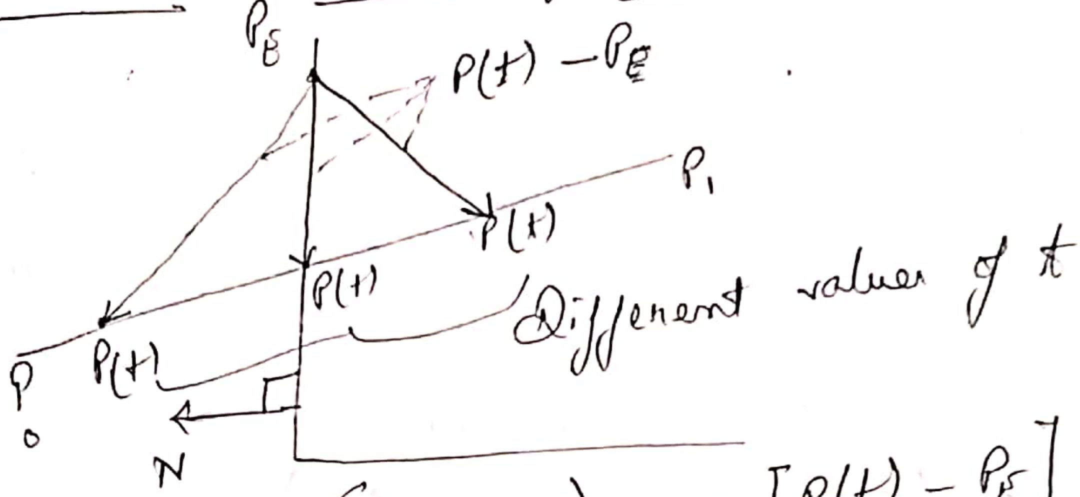
Cyrus Beck Line Clipping



$$\{ f(N, P_E) = N [P(t) - P_E] \}$$

$$P(t) = P_0 + t(P_1 - P_0) \quad \text{--- (1)}$$

$$[t = 0 \text{ to } 1]$$

$f(N, P_E) > 0$

Putting value of t in (1) —

$P(0) = 0$

$P(1) = P_1$

$P(t) - P_E$

$$f(N, P_E) = 0 \quad \text{(On edge)}$$
$$< 0 \quad \text{(Inside)}$$
$$> 0 \quad \text{(Outside)}$$

for $(N, P_E) = 0$

$$N \cdot (P(t) - P_E) = 0$$

Using (1) $\quad N \cdot \{[P_0 + t(P_1 - P_0)] - P_E\} = 0$

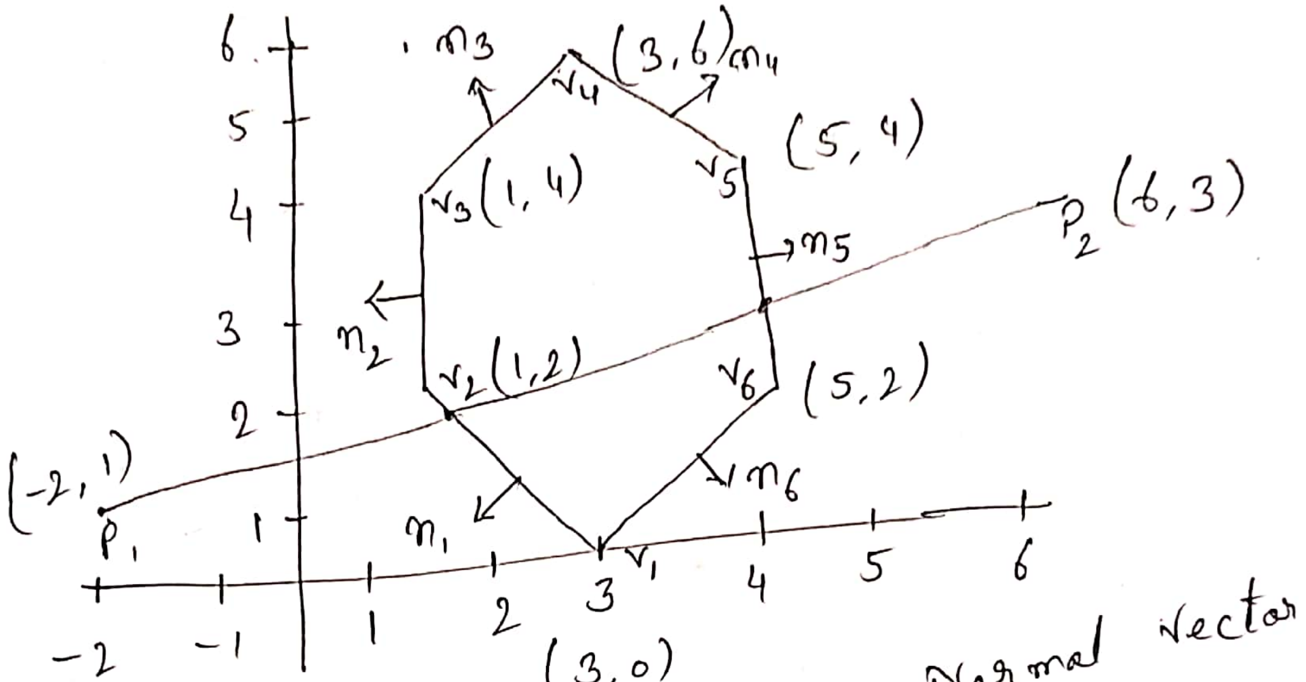
$$N \cdot (P_0 - P_E) + N \cdot (P_1 - P_0)t = 0$$

$$t = -N(P_0 - P_E) / N.(P_1 - P_0)$$

Assuming $P_1 - P_0 = D$

$$\boxed{t = \frac{-N(P_0 - P_E)}{N.D}}$$ $\{N.D \neq 0\}$

Line is ||



$P_1(-2,1)$ $P_2(6,3)$ → Normal vector

$n_1(-1,1)$ $n_2(-1,0)$ $n_3(-1,1)$ $n_4(1,1)$

$n_5(1,0)$ $n_6(1,-1)$

$$t_i = \frac{n_i(v_i - P_1)}{n_i \cdot (P_2 - P_1)}$$

$$t_1 = \frac{(-1,-1)[(3,0)-(-2,1)]}{(-1,-1)\cdot[(6,3)-(-2,1)]} = \frac{(-1,-1)(5,-1)}{(-1,-1)(8,2)}$$

$$= -4/-10 < 0$$

$t < 0$ (Entering point)

$$t_2 = \frac{(-1,0)\left[(1,2)-(-2,1)\right]}{(-1,0)\left[(6,3)-(-2,1)\right]} = \frac{(-1,0)(3,1)}{(-1,0)(8,2)}$$

$$= \frac{-3}{-8} < 0 \quad \text{Entering pt.}$$

$$t_3 = \frac{-3+3}{-8+2} = 0 \quad \text{Entering pt.}$$

$$t_4 = \frac{10}{10} = 1 > 0 \quad \text{Leaving pt.}$$

$$t_5 = 7/8 > 0 \quad \text{Leaving pt.}$$

$$t_6 = 6/6 = 1 > 0 \quad \text{Leaving pt.}$$

$$P(t) = P_0 + t(P_1 - P_0)$$

$$= (-2,1) + 4/10\left[(6,3)-(-2,1)\right]$$

$$= \left[6/5, 9/5\right]$$