$$I_x = A_x + (B_x - A_x)t = C_x + (D_x - C_x)u$$

$$I_y = A_y + (B_y - A_y)t = C_y + (D_y - C_y)u$$

$$A_x - C_x + (B_x - A_x)t = (D_x - C_x)u$$

$$A_y - C_y + (B_y - A_y)t = (D_y - C_y)u$$

multiply by $(D_x - C_x)$

$$(D_x - C_x)\left[A_y - C_y + (B_y - A_y)t\right] = (D_y - C_y)(D_x - C_x)u$$

$$(D_x - C_x)\left[A_y - C_y + (B_y - A_y)t\right] =$$

$$(D_y - C_y)\left[A_x - C_x + (B_x - A_x)t\right]$$

$$(D_x - C_x)(A_y - C_y) + (D_x - C_x)(B_y - A_y)t$$

$$= (D_y - C_y)(A_x - C_x) + (D_y - C_y)(B_x - A_x)t$$

$$\frac{(D_x - C_x)(A_y - C_y) - (D_y - C_y)(A_x - C_x)}{(D_y - C_y)(B_x - A_x) - (D_x - C_x)(B_y - A_y)} = t$$

$$t = \frac{top}{bottom}$$

$$I_x = A_x + (B_x - A_x)t = C_x + (D_x - C_x)u$$

$$I_y = A_y + (B_y - A_y)t = C_y + (D_y - C_y)u$$

$$(B_x - A_x)t = (C_x - A_x) + (D_x - C_x)u$$

$$(B_y - A_y)t = (C_y - A_y) + (D_y - C_y)u$$

$$(B_y - A_y)(B_x - A_x)t = \{(C_x - A_x) + (D_x - C_x)u\}(B_y - A_y)$$

$$(B_x - A_x)(B_y - A_y)t = \{(C_y - A_y) + (D_y - C_y)u\}(B_x - A_x)$$

Subtract

$$((x-A_x)(B_y-A_y) + (D_x-C_x)(B_y-A_y)u$$

$$= (C_y-A_y)(B_x-A_x) + (D_y-C_y)(B_x-A_x)u$$

$$\frac{(C_x-A_x)(B_y-A_y) - (C_y-A_y)(B_x-A_x)}{(D_y-C_y)(B_x-A_x) - (D_x-C_x)(B_y-A_y)} = u$$

Or

$$\frac{(C_y-A_y)(A_x-B_x) - ((C_x-A_x)(A_y-B_y) = u}{(D_y-C_y)(B_x-A_x) - (D_x-C_x)(B_y-A_y)}$$