Ausfüllen von Dreiecken

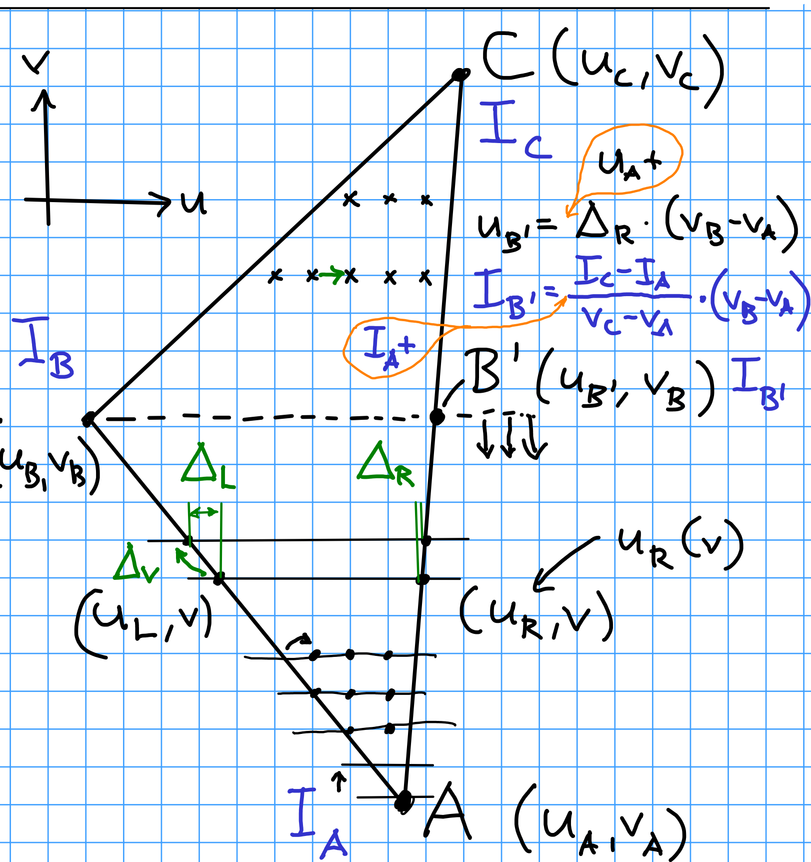
- $v_A < v_B < v_C$
- B liegt links von AC

$\boxed{\text{zeilenweise von unten nach oben, von links nach rechts.}}$

$$\Delta_u = I(u+1,v) - I(u,v)$$

$$\Delta_L = \frac{u_B - u_A}{v_B - v_A} \qquad \Delta_R = \frac{u_C - u_A}{v_C - v_A}$$

$$\Delta_v = \frac{I_B - I_A}{v_B - v_A} \qquad \Delta_u = \frac{I_{B'} - I_B}{u_{B'} - u_B}$$




```
v := ⌈v_A⌉ ; u_L := u_A + Δ_L · (⌈v_A⌉ − v_A) ;
        u_R := u_A + Δ_R · (⌈v_A⌉ − v_A) ; I_L^R := I_A^R + Δ_v · (⌈v_A⌉ − v_A) ;
while v ≤ v_B :
        u := ⌈u_L⌉ ; I^R := Δ_u · (u − u_L) + I_L^R ; I^G , I^B ....
        while u ≤ u_R :
                SetPixel (u, v, I^R, I^G, I^B)
                u := u + 1 ; I := I + Δ_u
        v := v + 1 ; u_L := u_L + Δ_L ; u_R := u_R + Δ_R ; I_L := I_L + Δ_v
Δ_L, I_L für die Strecke BC ausrechnen
v := v + 1 ; u_R := u_R + Δ_R ;   u_L, I_L ... ausrechnen
while v ≤ v_C :
        ......   (wie oben)
```

$$\boxed{I = I(u,v) = au + bv + c}$$

$$\Delta_u = I(u+1,v) - I(u,v) = a$$

$$I(u_A, v_A) = I_A = a \cdot u_A + b v_A + c$$

$$I(u_B, v_B) = I_B = \dots$$

$$I(u_C, v_C) = I_C$$

a, b, c ausrechnen ...

$$\Delta_u = a = \frac{\begin{vmatrix} I_A & v_A & 1 \\ I_B & v_B & 1 \\ I_C & v_B & 1 \end{vmatrix}}{\begin{vmatrix} u_A & v_A & 1 \\ u_B & v_B & 1 \\ u_C & v_B & 1 \end{vmatrix}} = \frac{(I_B - I_A)(v_C - v_A) - (I_C - I_A)(v_B - v_A)}{(u_B - u_A)(v_C - v_A) - (u_C - u_A)(v_B - v_A)}$$

Nenner

$$\begin{vmatrix} u_A & v_A & 1 \\ u_B & v_B & 1 \\ u_C & v_B & 1 \end{vmatrix} = \begin{vmatrix} u_A & v_A & 1 \\ u_B - u_A & v_B - v_A & 0 \\ u_C - u_A & v_C - v_A & 0 \end{vmatrix} = \begin{vmatrix} u_B - u_A & v_B - v_A \\ u_C - u_A & v_C - v_A \end{vmatrix} = \dots = \pm\, 2 \times \text{Fläche des Dreiecks ABC}$$