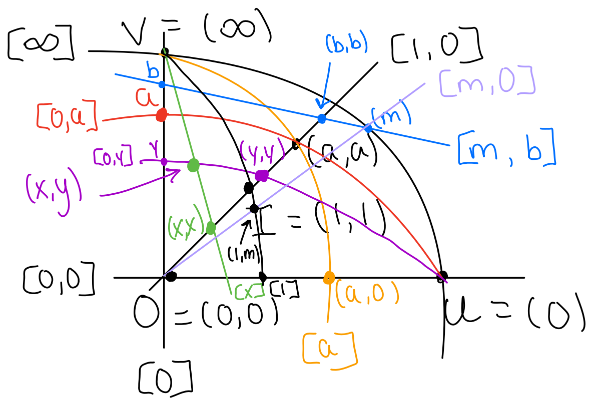
Back to coordinates & ternary rings:

What does it take for a ternary ring to be "linear", ie $T(m,x,b) = (m\cdot x)+b$?

$\hookrightarrow T(1, T(m,x,0), b)$

Quick review of (extended affine) coordinates:



$y = mx + 0$
$= m$ if $x=1$

Then $(x,y)\ I\ [m,b] \iff y = T(m,x,b)$

What are geometric conditions that tell us $T(m,x,b) = (m\cdot x)+b = T(1, T(m,x,0), b)$?

<u>Prop:</u> T is "linear" if whenever ABC & DEF are triangles s.t.

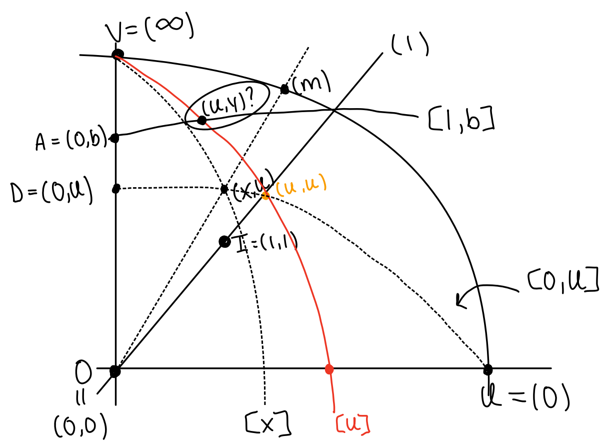
(1) are in perspective from $V=(\infty)$

(2) A & D are incident with $OV=[0]$

(3) $AB \cap DE$ and $AC \cap DF$ are on $UV = [\infty]$

(4) BC is incident with $U=(0)$,

then EF is also incident with $U=(0)$.



To Show: $T(m,x,b) = T(1, T(m,x,0), b)$

$u = T(m,x,0) \iff (x,u)\ I\ [m,0]$

$y = T(m,x,b) = T(1, \overbrace{T(m,x,0)}^{u}, b)$

$\iff (u,y)\ I\ [1,b]$