Frohman on Hyperbolic Geometry

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Charles Frohman I love giving that lecture. I derive that if I take the sector of the hyperbola x^2-y^2=1 with vertices (0,0),(1,0) and (c,s) where c>0 and edges consisting of line segments from (0,0) to (1,0) and (0,0) to (c,s) along with the arc of the hyperbola from (1,0) to (c,s) having signed area t/2 then (c,s)=(cosht,sinht). I found it in Klein's Elementary Mathematics from a Higher Viewpoint.

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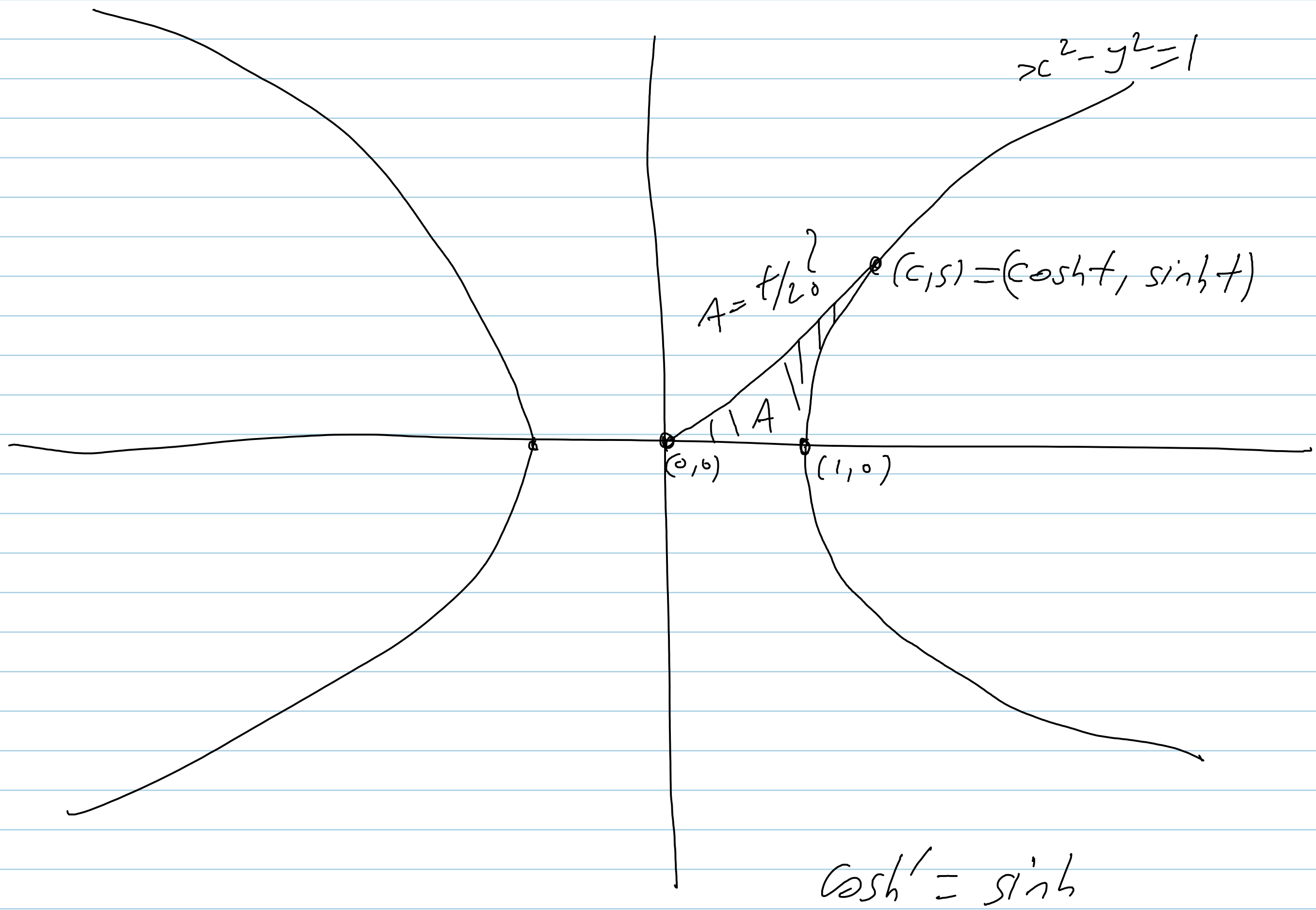

$\cosh' = \sinh$
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$$A = \frac{1}{2}\int x\,dy - y\,dx = \frac{1}{2}\int_0^t (\cosh^2 t - \sinh^2 t)\,dt = t/2$$