$$S\left(\frac{\tan\left(-\arctan\left(\frac{(1-\cos(t))\sin(t)}{-(1-\cos(t))\cos(t)+a}\right)+\theta\right)a}{\tan\left(-\arctan\left(\frac{\sin(t)}{\cos(t)}\right)+\theta\right)+\tan\left(-\arctan\left(\frac{(1-\cos(t))\sin(t)}{-(1-\cos(t))\cos(t)+a}\right)+\theta\right)}-a\right)+a$$