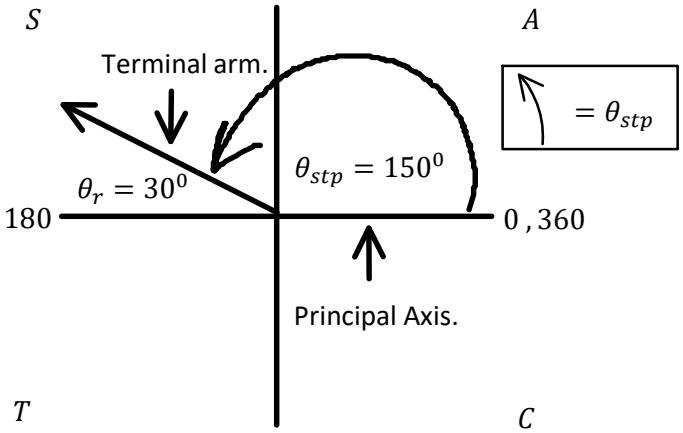
C12 - 4.2 - θ_r, θ_{stp} Notes

(always positive, between 0 $and \pi/2$)

θ_r: the "reference angle"is the angle between the terminal arm and the x-axis .

θ_{stp}: the "angle in standard position" from the principal axis (+ x-axis) to the terminal arm.

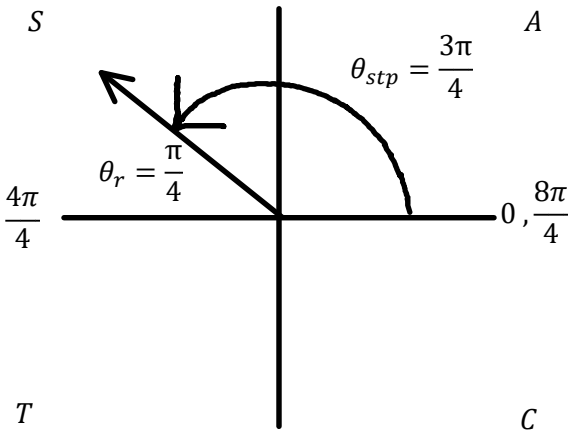


$\theta_r = 180 - 150$

$\theta_r = 30^0$

$\theta_{stp} = 180 - 30$

$\theta_{stp} = 150^0$



LCD

$\theta_r = \pi - \theta_{stp}$

$\theta_r = \pi - \frac{3\pi}{4}$

$\theta_r = \frac{4\pi}{4} - \frac{3\pi}{4}$

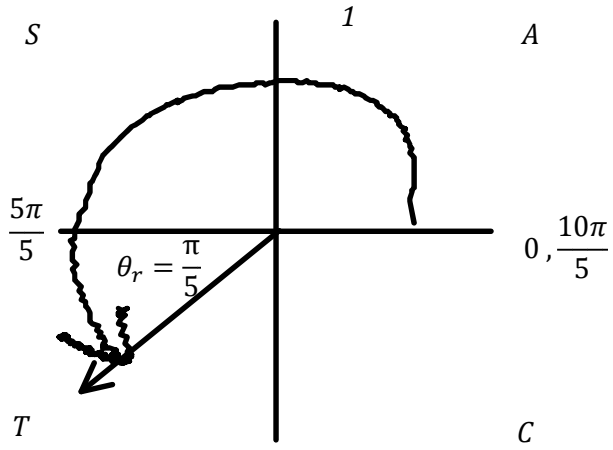
$\theta_r = \frac{\pi}{4}$

$\theta_{stp} = \pi - \theta_r$

$\theta_{stp} = \pi - \frac{\pi}{4}$

$\theta_{stp} = \frac{4\pi}{4} - \frac{\pi}{4}$

$\theta_{stp} = \frac{3\pi}{4}$



$\theta_r = \pi + \theta_{stp}$

$\theta_r = \pi + \frac{6\pi}{5}$

$\theta_r = \frac{5\pi}{5} + \frac{6\pi}{5}$

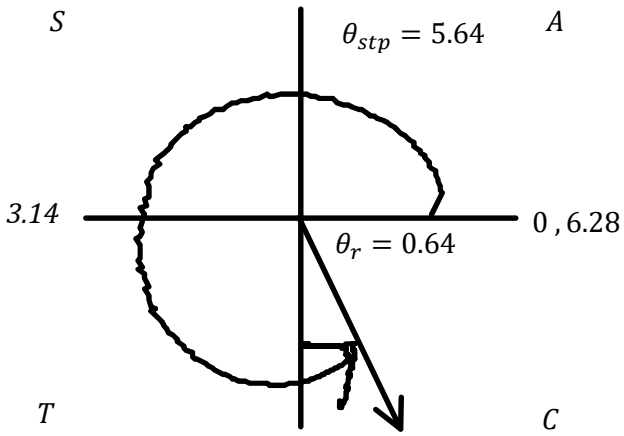
$\theta_r = \frac{\pi}{5}$

$\theta_{stp} = \pi + \theta_r$

$\theta_{stp} = \pi + \frac{\pi}{5}$

$\theta_{stp} = \frac{5\pi}{5} + \frac{\pi}{5}$

$\theta_{stp} = \frac{6\pi}{5}$



$\theta_r = 2\pi - \theta_{stp}$

$\theta_r = 2\pi - 5.64$

$\theta_r = 0.64$

$\theta_{stp} = 2\pi - \theta_r$

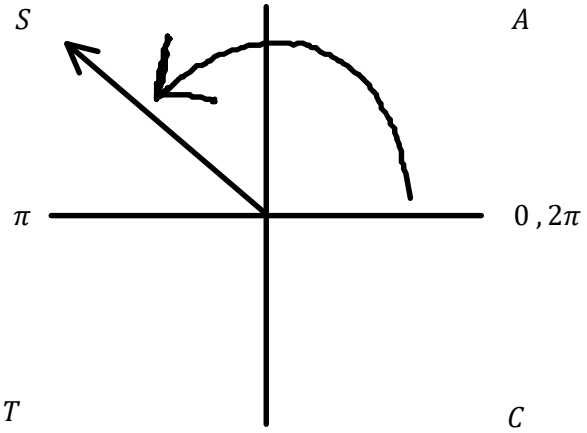
$\theta_{stp} = 2\pi - 0.64$

$\theta_{stp} = 5.64$

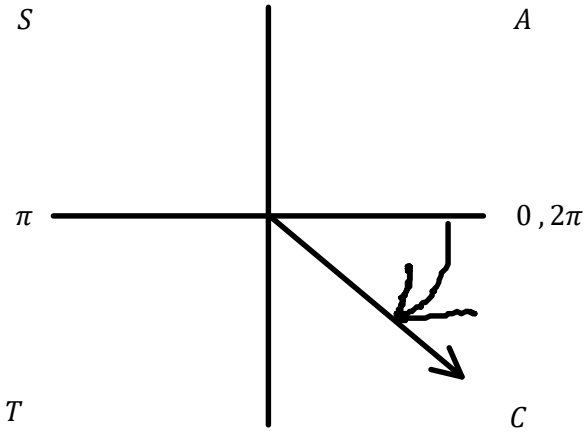
$\theta_{cot} = \theta_{stp} \pm 2\pi n, nEI$

C12 - 4.2 - $\pm\,\theta_{stp}, \theta_{cot}, \theta_{gen}$ Notes

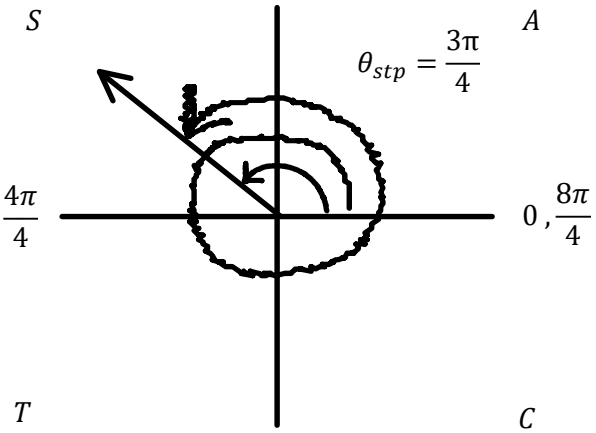
Counter-clockwise rotation is a positive θ_{stp}



Clockwise rotation is a negative θ_{stp}



θ_{cot}: the "co-terminal angle"is any angle with the same terminal arm.



$\theta_{cot} = \theta_{stp} \pm 2\pi$

$\theta_{cot} = \frac{3\pi}{4} + 2\pi$

$\theta_{cot} = \frac{3\pi}{4} + \frac{8\pi}{4}$

$\theta_{cot} = \frac{11\pi}{4}$

$\theta_{cot} = \theta_{stp} \pm 2\pi$

$\theta_{cot} = \frac{3\pi}{4} - 2\pi$

$\theta_{cot} = \frac{3\pi}{4} - \frac{8\pi}{4}$

$\theta_{cot} = -\frac{5\pi}{4}$

θ_{gen}: the "general solution"is all angles with the same terminal arm.

$\theta_{gen} = \theta_{stp} \pm 2\pi n, nEI$

$\theta_{gen} = \frac{3\pi}{4} \pm 2\pi n, nEI$

Basic logic will calculate $\theta_{stp}\ and\ \theta_r$ much more easily than using these formulas.

$\frac{9\pi}{2}$

$\frac{9\pi}{2} - 2\pi$

$\frac{9\pi}{2} - \frac{4\pi}{2}$

$\frac{5\pi}{2}$

$\frac{5\pi}{2} - 2\pi$

$\frac{5\pi}{2} - \frac{4\pi}{2}$

$\frac{\pi}{2}$

OR

$\frac{9\pi}{2} \div 2\pi$

$\frac{9\pi}{2} \times \frac{1}{2\pi}$

$\frac{9}{4} = 2.25$

$\frac{9\pi}{2} - 2(2\pi)$

$\frac{9\pi}{2} - 4\pi$

$\frac{9\pi}{2} - \frac{8\pi}{2}$

$\frac{\pi}{2}$

You may need to add or subtract 2π more than once.

OR $0.25 \times 2\pi = \frac{\pi}{2}$