M4SNELL

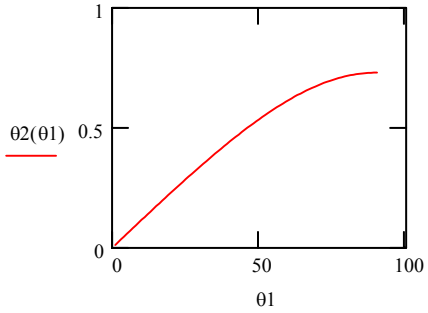
Snellius Law for real and imaginary angle of refraction.

We have n1 sinθ1 = n2 sinθ2, or θ2 = asin((n1/n2)sinθ1).
For n1> n2, after θ1is larger than the criticl angle, θ2 becomes complex.
with x + iy for θ2

1. Graph of θ2 = asin((n1/n2)sinθ1) from 0 to 90 for n1<n2

$\theta 1 := 1, 2 .. 90 \qquad n1 := 1 \qquad n2 := 1.5$

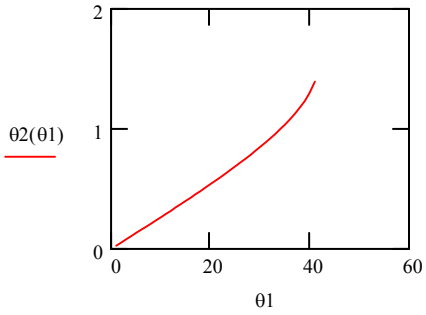
$$\theta 2(\theta 1) := \operatorname{asin}\left(\frac{n1}{n2} \cdot \sin\left(2 \cdot \frac{\pi}{360} \cdot \theta 1\right)\right)$$



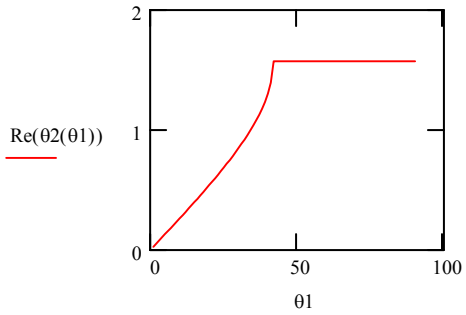
2. Graph of θ2 = asin((n1/n2)sinθ1) from 0 to 90 for n1>n2

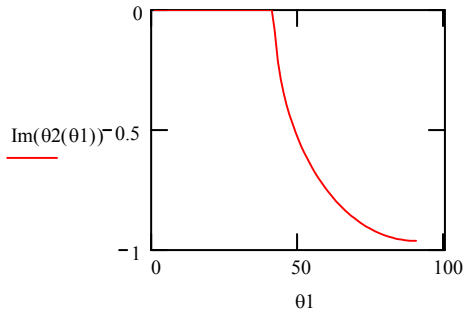
$\theta 1 := 1, 2 .. 90 \qquad nn1 := 1.5 \quad nn2 := 1$

$$\theta 2(\theta 1) := \operatorname{asin}\left(\frac{nn1}{nn2} \cdot \sin\left(2 \cdot \frac{\pi}{360} \cdot \theta 1\right)\right)$$



3. Graphs of real and imaginary parts separately.





$$\theta c := \frac{360}{2\cdot\pi}\cdot\operatorname{asin}\left(\frac{nn2}{nn1}\right) \qquad \theta c = 41.81$$