Different projections for ALADIN

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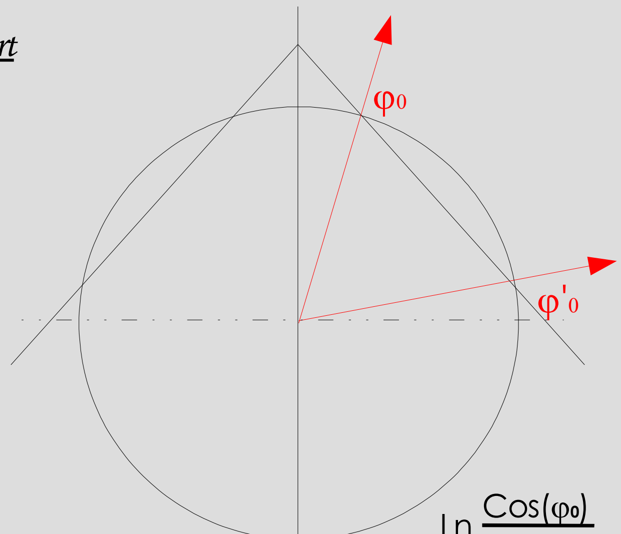
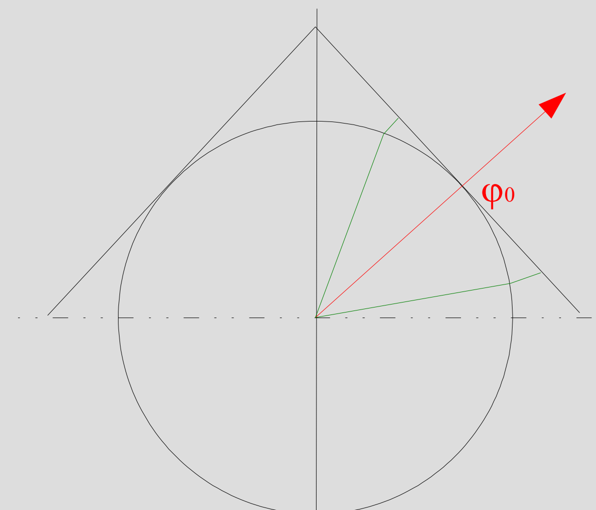
Different projections in ALADIN

Secant Projections | *Tangent Projections* | $Kl = Pole.\sin(\varphi_0)$

Lambert



$$Kl = \frac{\mathrm{Ln}\,\dfrac{\mathrm{Cos}(\varphi_0)}{\mathrm{Cos}(\varphi'_0)}}{\mathrm{Ln}\,\dfrac{\mathrm{Tg}(\pi/4-Pole.\varphi_0/2)}{\mathrm{Tg}(\pi/4-Pole.\varphi'_0/2)}}$$



$$Kl = Pole.\sin(\varphi_0)$$

Nota Bene : *Pole = 1 if North Hemisphere, Pole = -1 if South Hemisphere*

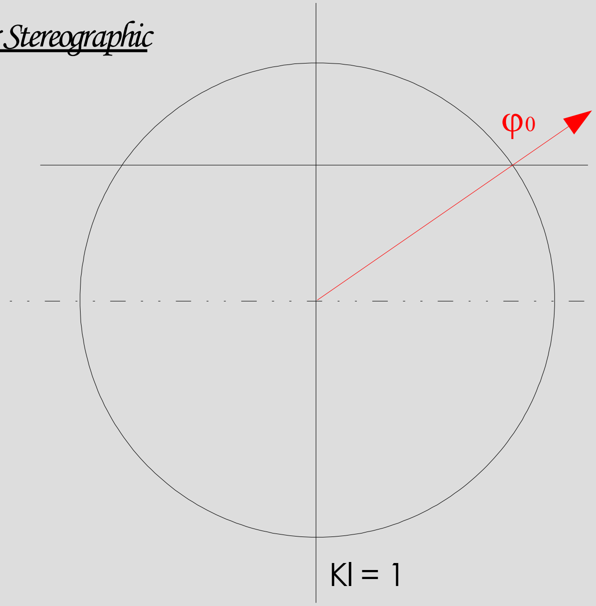
Different projections in ALADIN

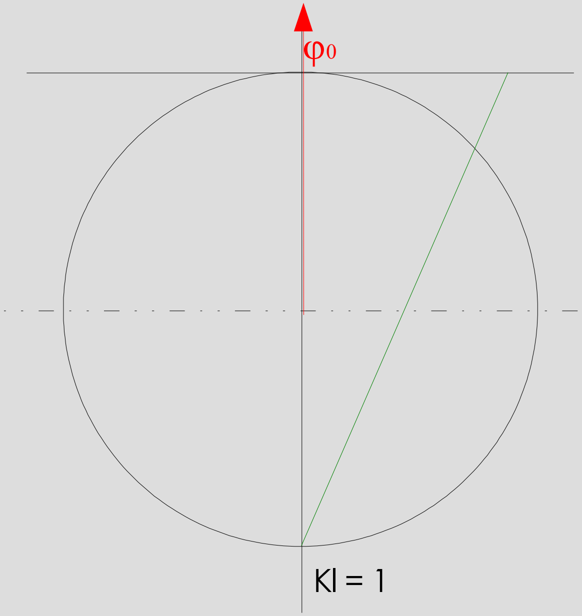
Secant Projections

Tangent Projections

Kl = Pole.sin(φ₀)

Polar Stereographic





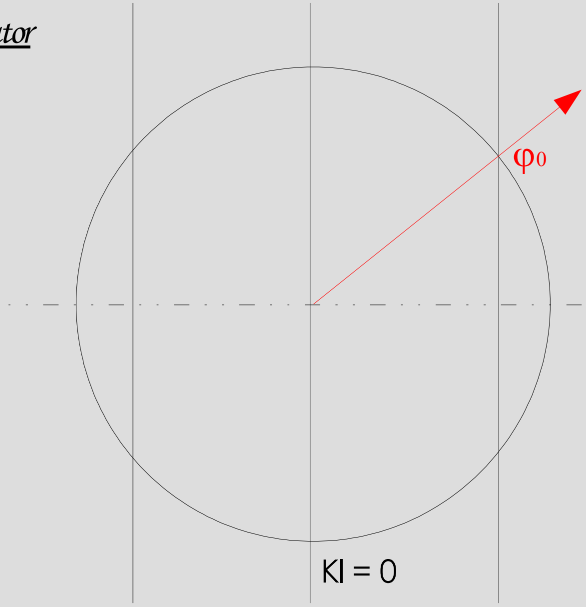
Different projections in ALADIN

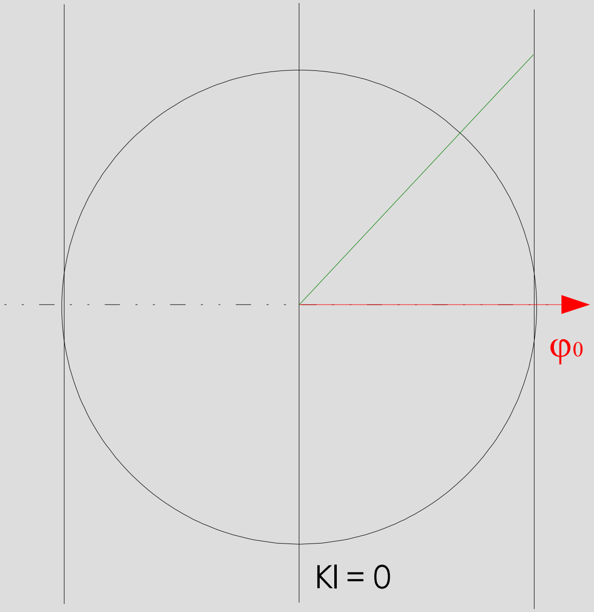
Secant Projections

Tangent Projections

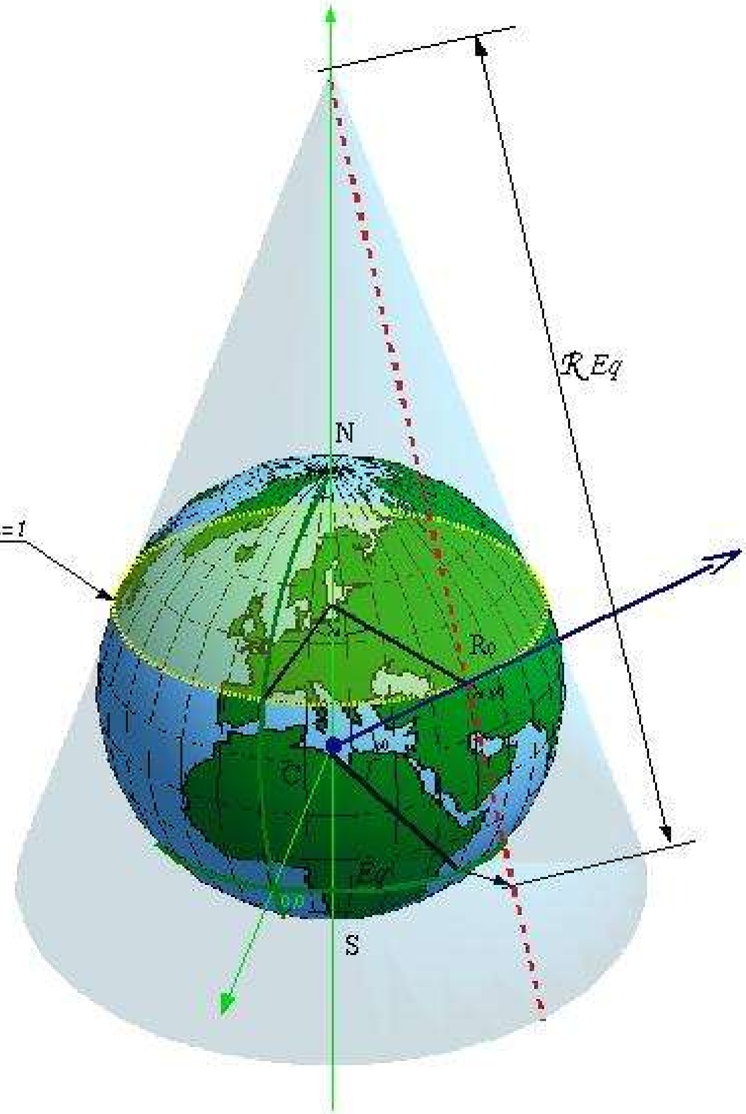
Kl = Pole.sin(φ_0)

Mercator





Tangent Lambert Projection



Formulae

	Lambert	Polar Stereographic	Mercator
Secant	$Kl=\frac{\ln\left[\frac{\cos(\varphi_0)}{\cos(\varphi_0')}\right]}{\ln\left[\frac{\tan\left(\frac{\pi}{4}-\frac{Pole\cdot\varphi_0}{2}\right)}{\tan\left(\frac{\pi}{4}-\frac{Pole\cdot\varphi_0'}{2}\right)}\right]}$	$Kl=1\ ,\ \varphi_0\neq\pm\frac{\pi}{2}$	$Kl=O\ ,\ \varphi_0\neq\pm\frac{\pi}{2}\ ,\ \varphi_0\neq 0$

Lambert and Polar Stereographic:

$$R_{Eq}=\frac{R_T\cdot\cos(\varphi_0)^{(1-Kl)}}{Kl}\cdot\left[1+Pole\cdot\sin(\varphi_0)\right]^{Kl}$$

$$\begin{cases} R_\varphi=R_{Eq}\cdot\tan\left(\frac{\pi}{4}-\frac{Pole\cdot\varphi}{2}\right)^{Kl}=R_{Eq}\cdot\left[\frac{\cos(\varphi)}{1+Pole\cdot\sin(\varphi)}\right]^{Kl} \\ \Theta_\lambda=Kl\cdot(\lambda-\lambda_0) \end{cases}$$

$$\begin{cases} x=R_\varphi\cdot\sin(\Theta_\lambda) \\ y=-Pole\cdot R_\varphi\cdot\cos(\Theta_\lambda) \end{cases}$$

Mercator:

$$\begin{cases} x=R_T\cdot\cos(\varphi_0)\cdot(\lambda-\lambda_0) \\ y=-Pole\cdot R_T\cdot\cos(\varphi_0)\cdot\ln\left[\tan\left(\frac{\pi}{4}-\frac{\varphi}{2}\right)\right] \end{cases}$$

All:

$$m_\varphi=\left[\frac{\cos(\varphi_0)}{\cos(\varphi)}\right]^{(1-Kl)}\cdot\left[\frac{1+Pole\cdot\sin(\varphi_0)}{1+Pole\cdot\sin(\varphi)}\right]^{Kl}$$

Lambert and Polar Stereographic:

$$m_\varphi=\frac{Kl\cdot R_\varphi}{R_T\cdot\cos(\varphi)}$$

Mercator:

$$m_\varphi=\left[\frac{\cos(\varphi_0)}{\cos(\varphi)}\right]$$

Formulae

Lambert | Polar Stereographic | Mercator

Tangent

Lambert

$$Kl = Pole \cdot \sin(\varphi_0)$$

$$R_{Eq} = \frac{R_T \cdot \cos(\varphi_0)^{(1-Kl)}}{Kl} \cdot [1+Kl]^{Kl}$$

$$\begin{cases} R_\varphi = R_{Eq} \cdot \left[\frac{\cos(\varphi)}{1+Pole \cdot \sin(\varphi)} \right]^{Kl} \\ \Theta_\lambda = Kl \cdot (\lambda - \lambda_0) \end{cases}$$

$$m_\varphi = \frac{Kl \cdot R_\varphi}{R_T \cdot \cos(\varphi)}$$

Polar Stereographic

$$Kl = Pole \cdot \sin(\varphi_0) = 1 \quad , \quad \varphi_0 = \pm \frac{\pi}{2}$$

$$R_{Eq} = 2 \cdot R_T$$

$$\begin{cases} R_\varphi = R_{Eq} \cdot \left[\frac{\cos(\varphi)}{1+Pole \cdot \sin(\varphi)} \right] \\ \Theta_\lambda = \lambda - \lambda_0 \end{cases}$$

$$m_\varphi = \frac{2}{1 + Pole \cdot \sin(\varphi)}$$

Lambert and Polar Stereographic:

$$\begin{cases} x = R_\varphi \cdot \sin(\Theta_\lambda) \\ y = -Pole \cdot R_\varphi \cdot \cos(\Theta_\lambda) \end{cases}$$

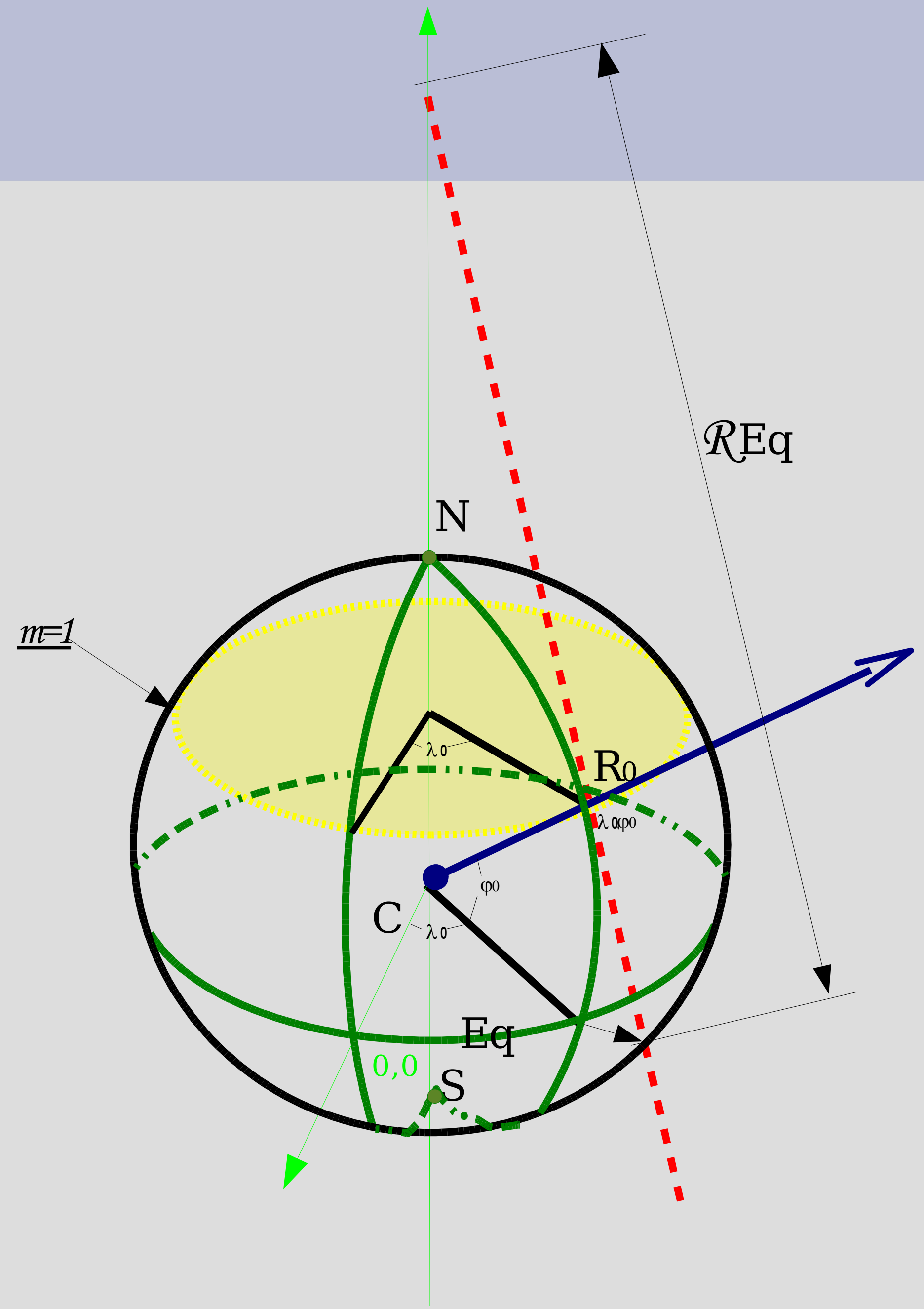
Mercator

$$Kl = Pole \cdot \sin(\varphi_0) = 0 \quad , \quad \varphi_0 = 0$$

$$\begin{cases} x = R_T \cdot (\lambda - \lambda_0) \\ y = -Pole \cdot R_T \cdot \ln\left[\tan\left(\frac{\pi}{4} - \frac{\varphi}{2} \right) \right] \end{cases}$$

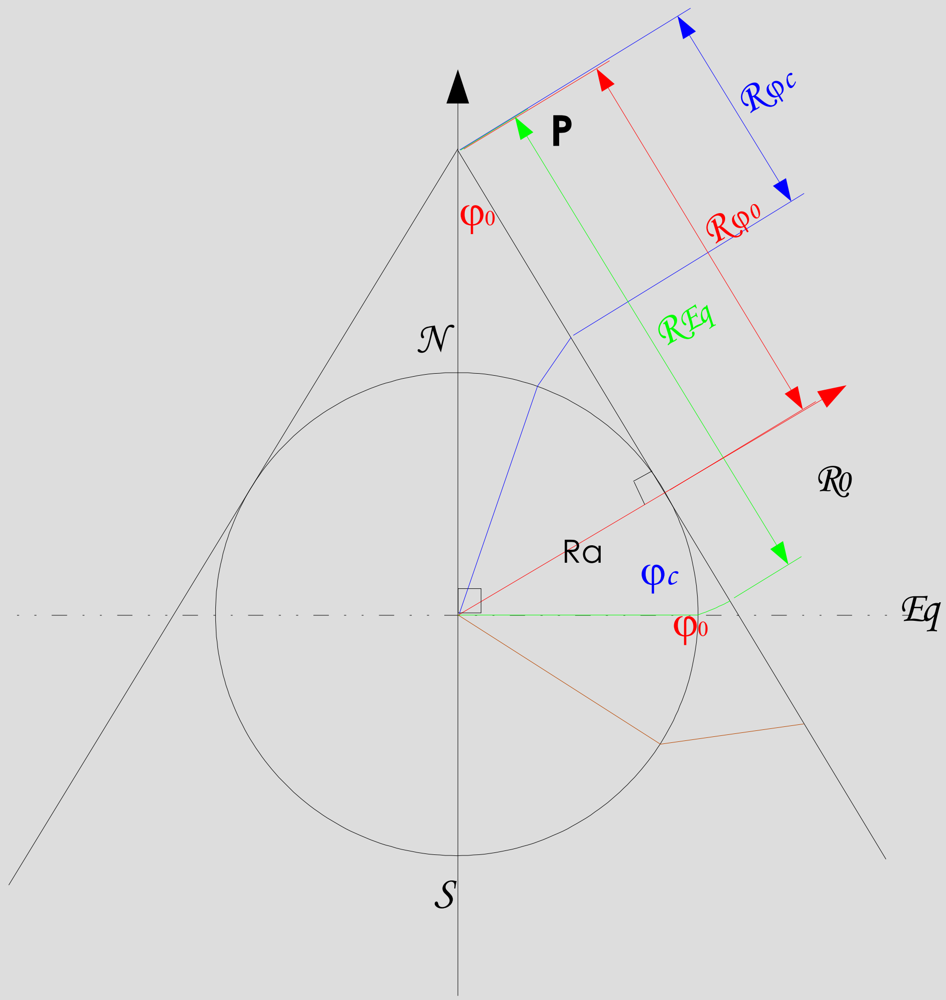
$$m_\varphi = \frac{1}{\cos(\varphi)}$$

Tangent Lambert Projection



Lambert tangent projection

Kl=*sin*(φ*0*)



Lambert tangent projection

$Kl = \sin(\varphi_0)$