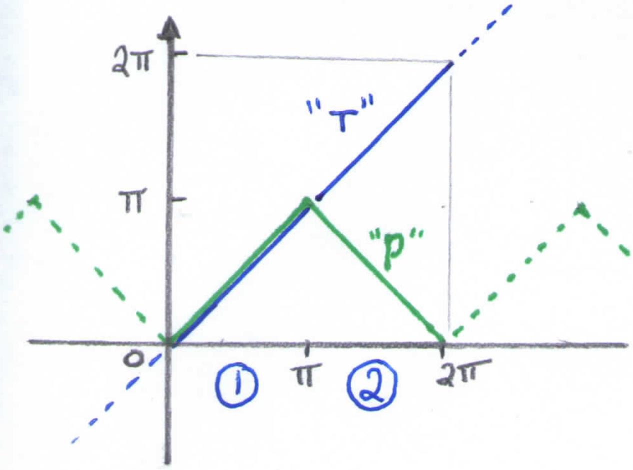
POLAR ANGLE "P" AS A FUNCTION OF LOCAL HOUR ANGLE "LHA" (OR: "T")



①	②
$\underline{P = T}$	$\underline{P = 2\pi - T}$
$dP = dT$	$dP = -dT$
$\sin P = \sin T$	$\sin P = -\sin T$
$\boxed{\cos P = \cos T}$	$\boxed{\cos P = \cos T}$
$\tan P = \tan T$	$\tan P = -\tan T$
$\cot P = \cot T$	$\cot P = -\cot T$

1 - Tabular Azimuth "Z" [0°-180°] and True Azimuth "A_z" [0°-360°] From Position and Time

(0): $\sin P \cot Z = tg\, D \cos\varphi - \sin\varphi \cos D$ D: Declination φ: Latitude

$$\boxed{\begin{array}{l} (1.1):\ Z = \operatorname{acot}\left[(tg\, D \cos\varphi - \sin\varphi \cos D)/\sin P\right] \text{ with: } \operatorname{acot} Y = \pi/2 - \operatorname{atan} Y \\ (1.2):\ A_z = -Z \operatorname{sign}(\sin T) \quad \text{with} \quad \operatorname{sign}(X): \begin{cases} = +1 & \text{if } X \geq 0 \\ = -1 & \text{if } X < 0 \end{cases} \end{array}}$$

2 - True Azimuth Angular Rate dA_z/dT

(2.0): $dZ/dP = \sin Z \cos Z / tg\, P - \sin\varphi \sin^2 Z$

$\underline{0 \leq T \leq \pi}$ $dZ = -dA_z$

$P = T$ $dP = dT$ $Z = -A_z$ $\sin Z = -\sin A_z$ $\cos Z = \cos A_z$

(2.0) becomes:

$$-dA_z/dT = -\sin A_z \cos A_z / tg\, P - \sin\varphi \sin^2 A_z$$

(2.1.1): $dA_z/dT = \sin\varphi \sin^2 A_z + \sin A_z \cos A_z / tg\, P$

$\underline{\pi \leq T \leq 2\pi}$

$P = 2\pi - T$ $dP = -dT$ $Z = A_z$ $dZ = dA_z$ $\sin Z = \sin A_z$ $\cos Z = \cos A_z$

(2.0) becomes:

$$-dA_z/dT = \sin A_z \cos A_z / tg\, P - \sin\varphi \sin^2 A_z$$

(2.1.2.): $dA_z/dT = \sin\varphi \sin^2 A_z - \sin A_z \cos A_z / tg\, P$

(2.1.1) and (2.1.2) can be summarized into:

$$\boxed{(2.2):\ dA_z/dT = \sin\varphi \sin^2 A_z + \left(\sin A_z \cos A_z / tg\, P\right) \operatorname{sign}(\sin T)}$$

Au Roc Saint Luc
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