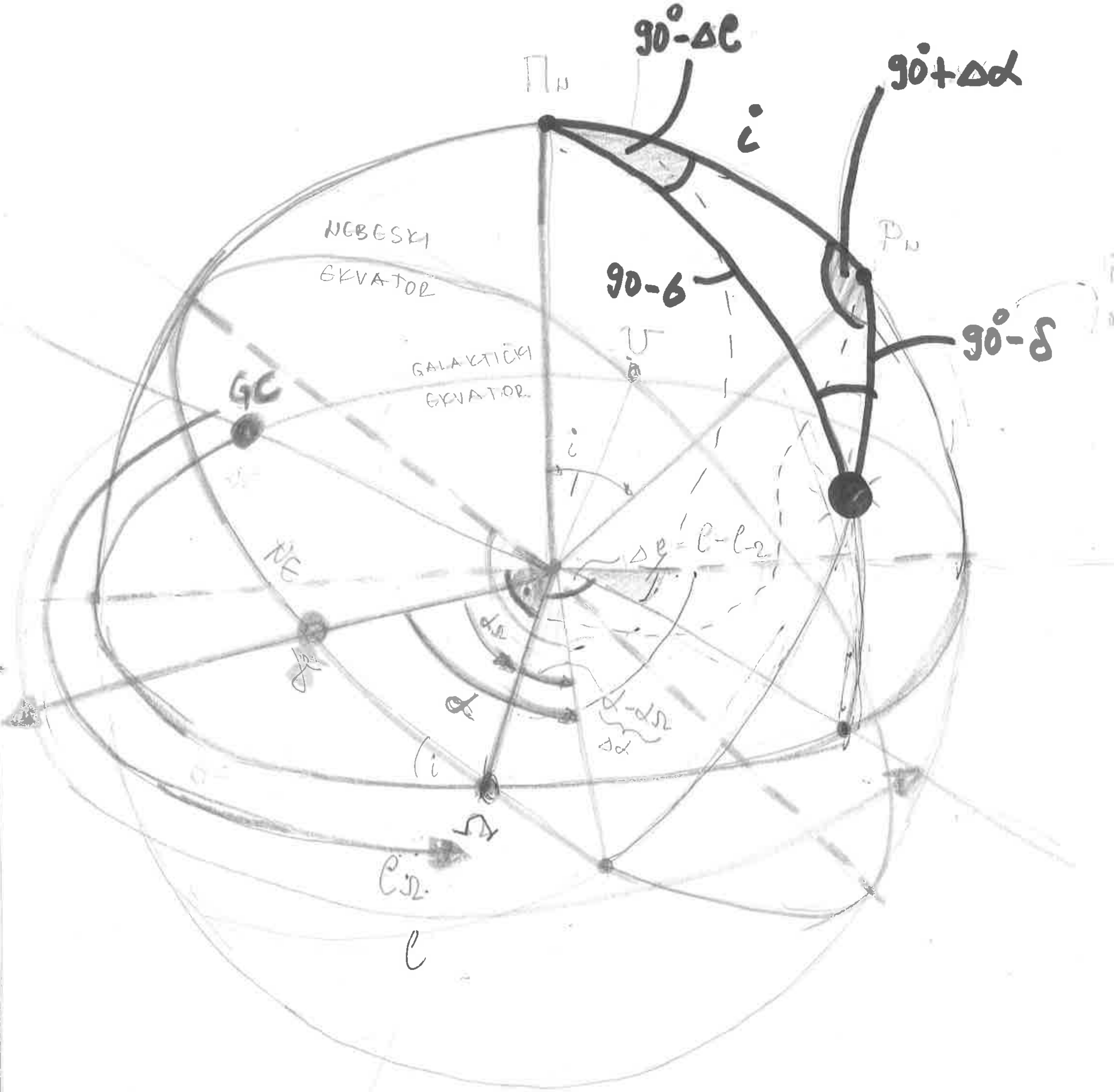
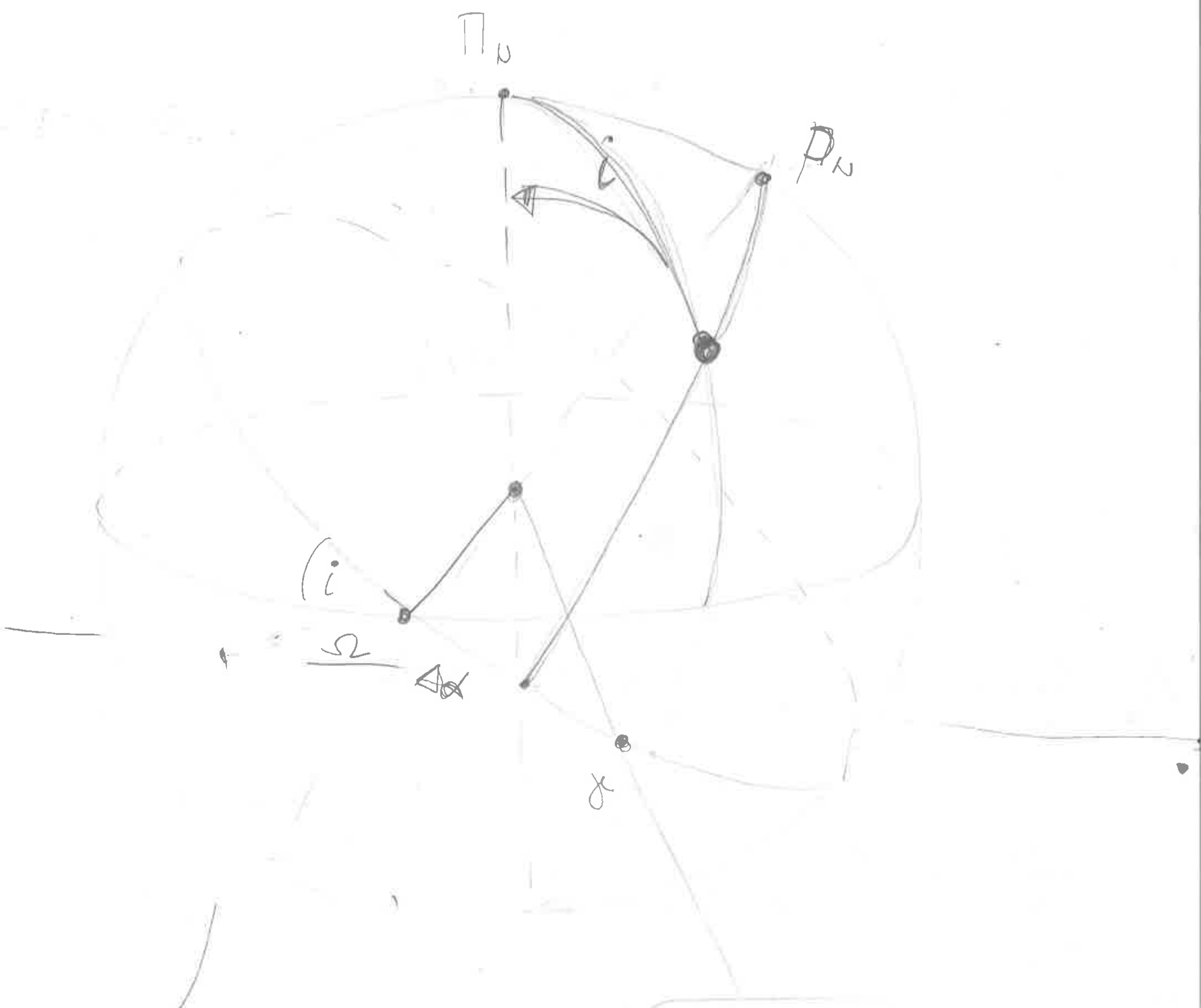


$90° - \Delta \ell$
$90° + \Delta\alpha$
Π_N
i
NEBESKI
EKVATOR
P_N
$90 - b$
$90° - \delta$
GALAKTICKI
EKVATOR
GC
i
NE
$\Delta \ell = \ell - \ell_\Omega$
α_Ω
α
$\alpha - \alpha_\Omega$
$\Delta\alpha$
i
Ω
ℓ_Ω
ℓ

TRANSFORMACIJE KOORDINATA IZ EKV U GAL



$\Delta\alpha = \alpha - \alpha_\Omega$

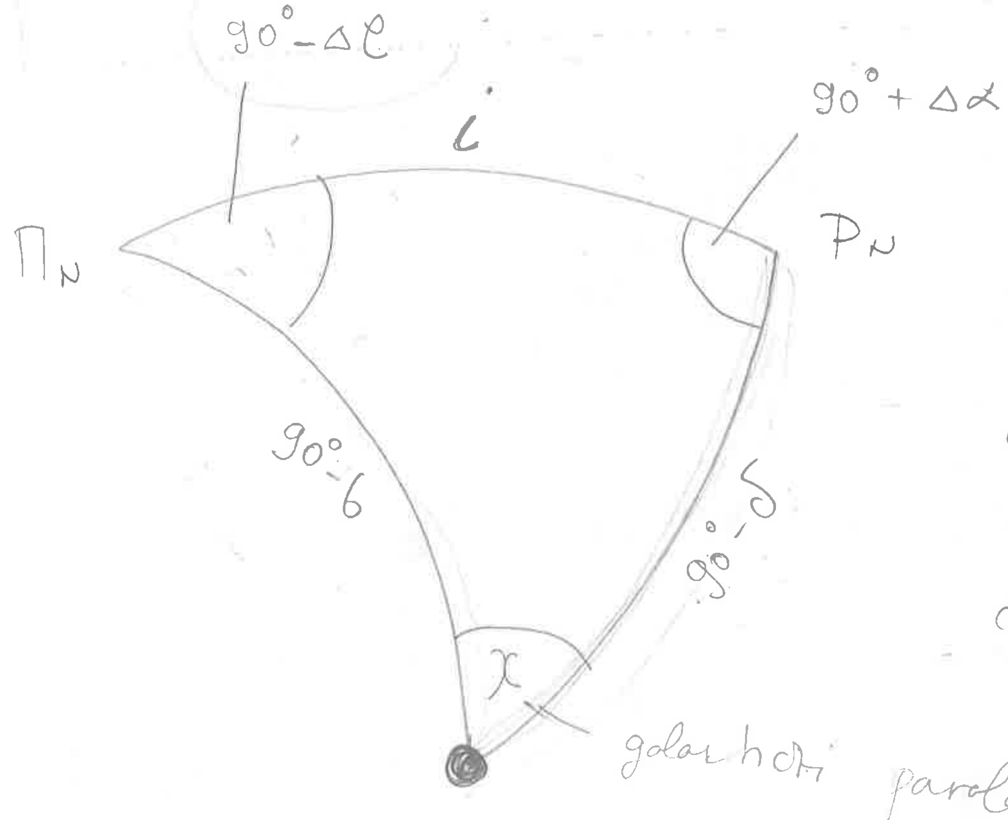
$\Delta l = l - l_\Omega$

$l_{P_N} = 90° + l_\Omega$

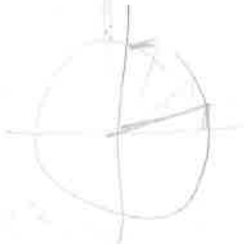
$\alpha_\Omega = 282,86$

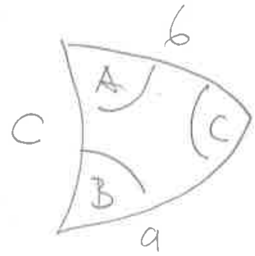
$l_\Omega = 32,93$

$i = 62,87$



paralaktički ugao





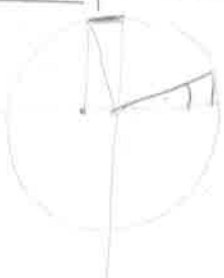
$\cos a = \cos b \cos c + \sin b \sin c \cos A$

1. KOSINUSNO PRAVILO ZA $90^\circ - b$)

$$\underbrace{\cos(90^\circ - b)} = \cos i \cdot \cos(90^\circ - \delta) + \sin i \sin(90^\circ - \delta)\overbrace{\cos(90^\circ + \Delta\alpha)}^{-\sin\Delta\alpha}$$

$$\boxed{\sin b = \cos i \sin \delta - \sin i \cos \delta \sin \Delta\alpha}$$

*



2. SINUSNO PRAVILO

$$\frac{\sin(90^\circ - \delta)}{\sin(90^\circ - \Delta\ell)} = \frac{\sin(90^\circ - b)}{\sin(90^\circ + \Delta\alpha)}$$

$$\cos b \cos \Delta\ell = \underbrace{\sin(90^\circ - \delta)}_{\cos\delta} \cdot \underbrace{\overbrace{\sin(90^\circ + \Delta\alpha)}^{\cos\Delta\alpha}}_{\cos(\Delta\alpha)}$$

$$\boxed{\cos b \cos \Delta\ell = \cos \delta \cos \Delta\alpha}$$

**

3. KOSINUSNO PRAVILO ZA $90° - \delta$

$$\cos(90° - \delta) = \cos i \cos(90° - b) + \sin i \sin(90° - b) \cdot \cos(90 - \Delta \ell)$$

$$\sin\delta = \cos i \sin b + \sin i \cos b \sin\Delta\ell$$

→ Ubaci se $\sin b$ iz *

$$\sin\delta = \cos i\,(\cos i \sin\delta - \sin i \cos\delta \sin\Delta\alpha) + \sin i \cos b \sin\Delta\ell$$

$$\sin\delta = \cos^2 i \sin\delta - \sin i \cos i \cos\delta \sin\Delta\alpha + \sin i \cos b \sin\Delta\ell$$

$$\sin i \cos b \sin\Delta\ell = \sin\delta - \cos^2 \sin\delta + \sin i \cos i \cos\delta \sin\Delta\alpha$$

$$\sin i \cos b \sin\Delta\ell = \sin\delta \sin^2 i + \sin i \cos i \cos\delta \sin\Delta\alpha \quad / \sin i$$

$$\boxed{\cos b \sin\Delta\ell = \sin\delta \sin i + \cos i \cos\delta \sin\Delta\alpha} \quad ***$$

$\alpha - \alpha_\Omega$

⇒

$$* \quad \sin b = \cos i \sin\delta - \sin i \cos\delta \sin\Delta\alpha$$

$$*** \quad \sin\Delta\ell = \frac{\sin\delta \sin i + \cos i \cos\delta \sin\Delta\alpha}{\cos b}$$

$$** \quad \cos\Delta\ell = \frac{\cos\delta \cos\Delta\alpha}{\cos b}$$

$$\Delta\ell = \ell - \ell_\Omega \qquad \ell = \Delta\ell + \ell_\Omega$$

MATRICA ROTACIJE

$$\boxed{\begin{array}{l}\sin(\alpha-\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta\\ \cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta\end{array}}$$

$$\sin b = \cos i \sin\delta - \sin i \cos\delta \sin(\alpha-\alpha_\Omega)$$

$$\cos b \cos(l-l_\Omega) = \cos\delta\cos(\alpha-\alpha_\Omega)$$

$$\cos b \sin(l-l_\Omega) = \sin\delta\sin i + \cos i\cos\delta\sin(\alpha-\alpha_\Omega)$$

$$\overbrace{\sin b}^{z_G} = \cos i\sin\delta - \sin i\cos\delta(\sin\alpha\cos\alpha_\Omega + \cos\alpha\sin\alpha_\Omega) =$$

$$= \cos i\underbrace{\sin\delta}_{z_E} - \sin i\cos\alpha_\Omega\underbrace{\cos\delta\sin\alpha}_{y_E} + \sin i\sin\alpha_\Omega\underbrace{\cos\alpha\cos\delta}_{x_E}$$

$$\boxed{z_G = \sin i\sin\alpha_\Omega\, x_E - \sin i\cos\alpha_\Omega\, y_E + \cos i\, z_E} \quad *$$

$$\cos b(\cos l\cos l_\Omega + \sin l\sin l_\Omega) = \cos\delta(\cos\alpha\cos\alpha_\Omega + \sin\alpha\sin\alpha_\Omega)$$

$$\underbrace{\cos b\cos l}_{x_G}\cos l_\Omega + \underbrace{\cos b\sin l}_{y_G}\sin l_\Omega = x_E\cos\alpha_\Omega + y_E\sin\alpha_\Omega$$

$$\boxed{x_G\cos l_\Omega + y_G\sin l_\Omega = x_E\cos\alpha_\Omega + y_E\sin\alpha_\Omega} \quad ** \quad \cdot\sin l_\Omega$$

$$\cos b(\sin l\cos l_\Omega - \cos l\sin l_\Omega) = \sin\delta\sin i + \cos i\cos\delta(\sin\alpha\cos\alpha_\Omega - \cos\alpha\sin\alpha_\Omega)$$

$$\boxed{y_G\cos l_\Omega - x_G\sin l = z_E\sin i + y_E\cos i\cos\alpha_\Omega - x_E\cos i\sin\alpha_\Omega} \quad ***$$

$\cdot\cos l_\Omega$

$$x_G \sin\ell_\Omega \cos\ell_\Omega + y_G \sin^2\ell_\Omega = x_E \cos\alpha_\Omega \sin\ell_\Omega + y_E \sin\alpha_\Omega \sin\ell_\Omega$$

$$-x_G \sin\ell_\Omega \cos\ell + y_G \cos^2\ell_\Omega = z_E \sin i \cos\ell_\Omega + y_E \cos i \cos\alpha_\Omega \cos\ell_\Omega - x_E \cos i \sin\alpha_\Omega \cos\ell_\Omega$$

$$\boxed{\begin{aligned} y_G = {} & x_E(\cos\alpha_\Omega \sin\ell_\Omega - \cos i \sin\alpha_\Omega \cos\ell_\Omega) + \\ & y_E(\sin\alpha_\Omega \sin\ell_\Omega + \cos i \cos\alpha_\Omega \cos\ell_\Omega) + \\ & z_E \sin i \cos\ell_\Omega \end{aligned}}$$

$** \cdot \cos\ell_\Omega$ i $*** \cdot (-\sin\ell_\Omega)$

$$x_G \cos^2\ell_\Omega + y_G \sin\ell_\Omega \cos\ell_\Omega = x_E \cos\alpha_\Omega \cos\ell_\Omega + y_E \sin\alpha_\Omega \cos\ell_\Omega$$

$$x_G \sin^2\ell_\Omega - y_G \sin\ell_\Omega \cos\ell_\Omega = -z_E \sin i \sin\ell_\Omega - y_E \cos i \cos\alpha_\Omega \sin\ell_\Omega + x_E \cos i \sin\alpha_\Omega \sin\ell_\Omega$$

$$\begin{aligned} x_G = {} & x_E(\cos\alpha_\Omega \cos\ell_\Omega + \cos i \sin\alpha_\Omega \sin\ell_\Omega) + \\ & y_E(\sin\alpha_\Omega \cos\ell_\Omega - \cos i \cos\alpha_\Omega \sin\ell_\Omega) - \\ & z_E \sin i \sin\ell_\Omega \end{aligned}$$

$$\begin{bmatrix} x_G \\ y_G \\ z_G \end{bmatrix} = R_G \begin{bmatrix} x_E \\ y_E \\ z_E \end{bmatrix}$$

MATRICA ROTACIJE

$$R_G = \begin{bmatrix} \cos\alpha_\Omega \cos\ell_\Omega + \cos i \sin\alpha_\Omega \sin\ell_\Omega & \sin\alpha_\Omega \cos\ell_\Omega - \cos i \cos\alpha_\Omega \sin\ell_\Omega & -\sin i \sin\ell_\Omega \\ \cos\alpha_\Omega \sin\ell_\Omega - \cos i \sin\alpha_\Omega \cos\ell_\Omega & \sin\alpha_\Omega \sin\ell_\Omega + \cos i \cos\alpha_\Omega \cos\ell_\Omega & \sin i \cos\ell_\Omega \\ \sin i \sin\alpha_\Omega & -\sin i \cos\alpha_\Omega & \cos i \end{bmatrix}$$