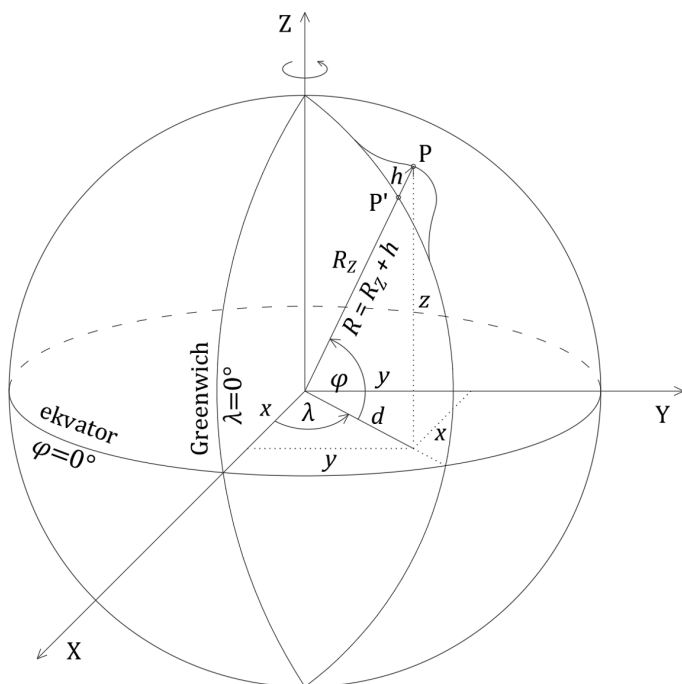


VAJA 8: PROSTORSKI KOORDINATNI SISTEMI

2025/2026

1 $(\varphi, \lambda, R) \rightarrow (X, Y, Z)$: PRETVORBA IZ GEOGRAFSKIH (KROGELNIH) KOORDINAT V 3D KARTEZIČNE KOORDINATE



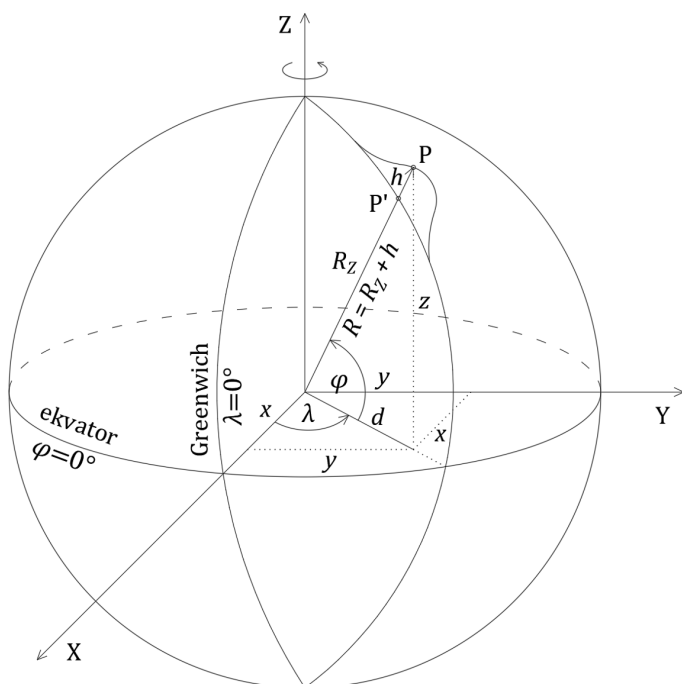
$$X = R \cos \varphi \cos \lambda$$

$$Y = R \cos \varphi \sin \lambda$$

$$Z = R \sin \varphi$$

$$R = R_Z + h$$

2 $(X, Y, Z) \rightarrow (\varphi, \lambda, R)$: PRETVORBA 3D KARTEZIČNIH KOORDINAT V GEOGRAFSKE (KROGELNE) KOORDINATE



$$R = \sqrt{X^2 + Y^2 + Z^2}$$

$$\varphi = \arcsin \frac{Z}{R} \in [-90^\circ, 90^\circ]$$

$$\lambda = \arctan \frac{Y}{X} \in (-180^\circ, 180^\circ]$$

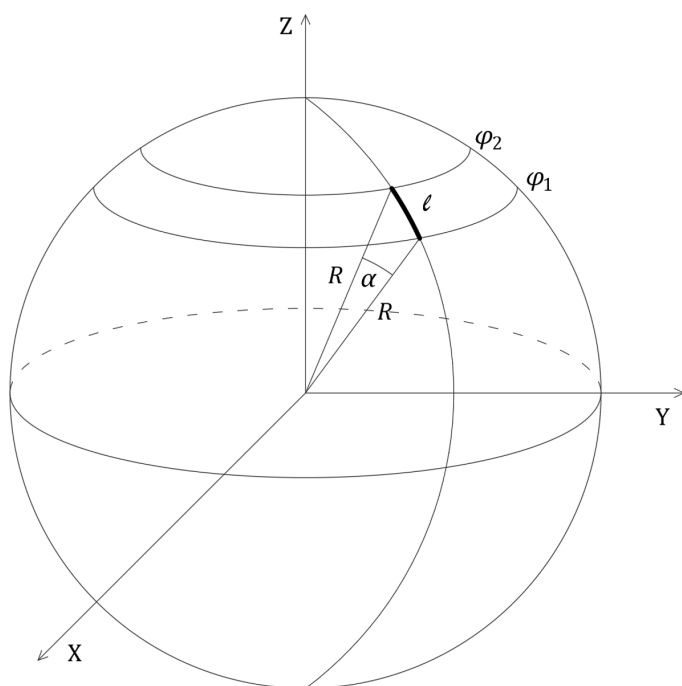
Če $X < 0$:

– če $Y \geq 0$: $\lambda = \lambda + 180^\circ$,

– če $Y < 0$: $\lambda = \lambda - 180^\circ$.

$$h = R - R_Z$$

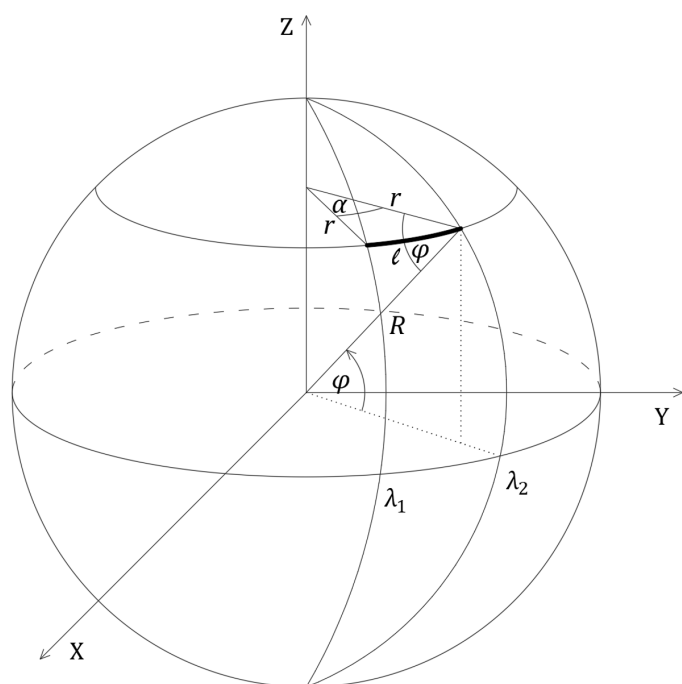
3 DOLŽINA LOKA POLDNEVNIKA (MERIDIANA) NA ZEMLJI-KROGLI



$$\alpha = \Delta\varphi = |\varphi_2 - \varphi_1|$$

$$l = R \alpha [^\circ] \frac{\pi}{180^\circ} = R \alpha [\text{rad}]$$

4 DOLŽINA LOKA VZPOREDNIKA NA ZEMLJI-KROGLI



$$\alpha = \Delta\lambda = |\lambda_2 - \lambda_1|$$

$$r = R \cos \varphi$$

$$l = r \alpha [^\circ] \frac{\pi}{180^\circ} = r \alpha [\text{rad}]$$