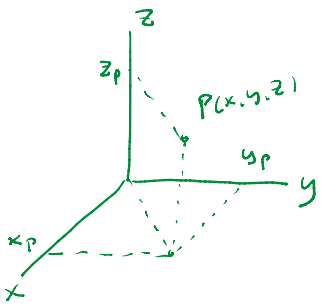
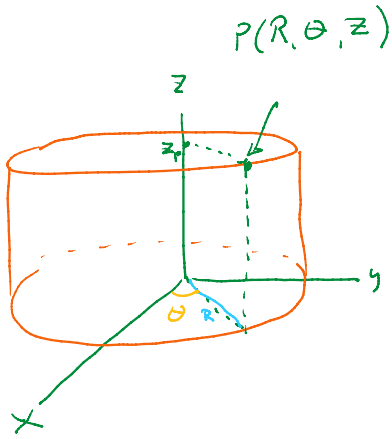
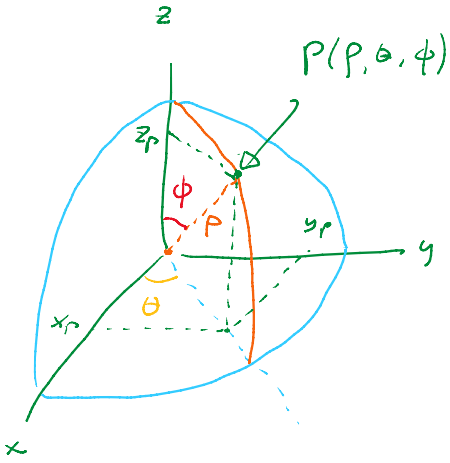
TW3_MTK_Week1_Les1

Tuesday, November 10, 2020 9:46 AM

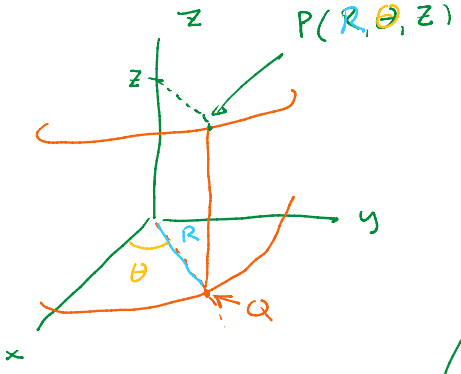
coördinaten:

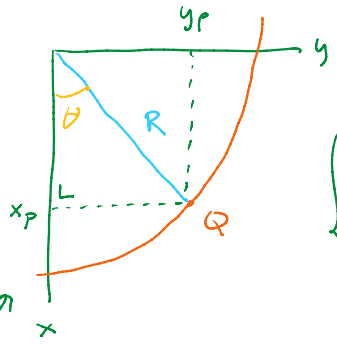






cilinder → xyz:





$$\cos\theta = \frac{x_p}{R} \Rightarrow \begin{cases} x_p = R\cdot\cos\theta \\ y_p = R\cdot\sin\theta \\ z_p = z \end{cases}$$

xyz → Rθz ?

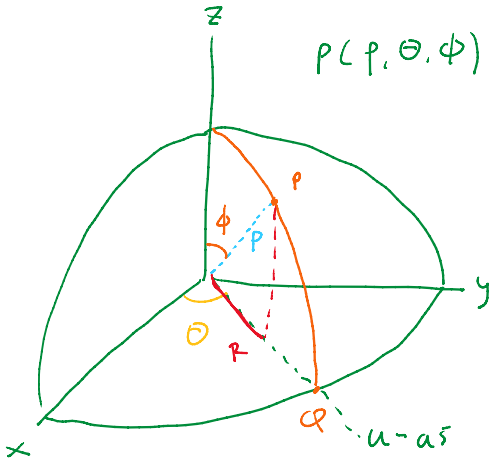
xy-vlak: $\begin{cases} R = \sqrt{x_p^2 + y_p^2} \\ \theta = \text{arctan}\left(\frac{y_p}{x_p}\right) \\ z = z \end{cases}$

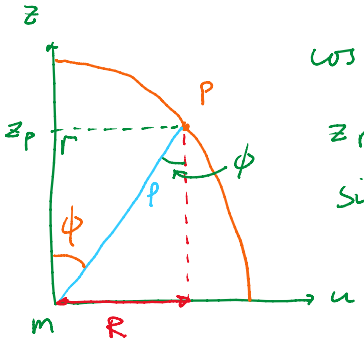
$(R,\theta,z) = (4, \frac{\pi}{3}, -3)$

$$\begin{cases} x = R\cdot\cos\theta = 4\cdot\cos\frac{\pi}{3} = 4\cdot\frac{1}{2} = 2 \\ y = R\cdot\sin\theta = 4\cdot\sin\frac{\pi}{3} = 4\cdot\frac{1}{2}\sqrt{3} = 2\sqrt{3} \\ z = -3 \end{cases}$$

spherical coördinates:

sphere = bol



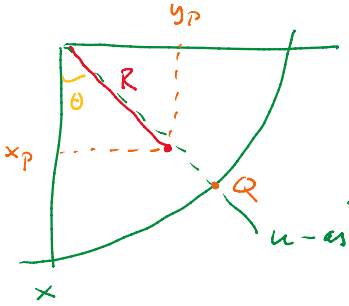


$$\cos\phi = \frac{z_p}{\rho} \Rightarrow$$

$$z_p = \rho\cdot\cos\phi$$

$$\sin\phi = \frac{R}{\rho} \Rightarrow$$

$$R = \rho\cdot\sin\phi$$



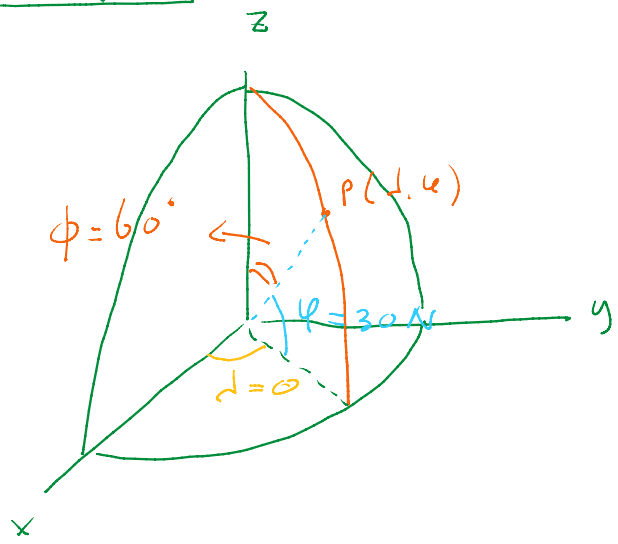
$$x = R\cdot\cos\theta$$

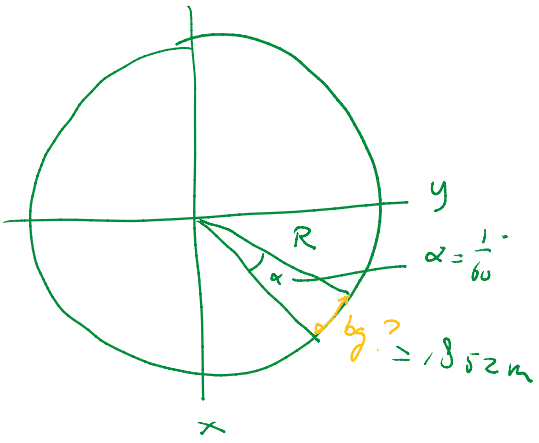
$$x = \rho\cdot\sin\phi\cdot\cos\theta$$

$$y = \rho\cdot\sin\phi\cdot\sin\theta$$

$y = \rho \cdot \sin\phi \cdot \sin\theta$

Navigatie





λ = longitude / lengte

φ = latitude / breedte

boog = R · hoek [Radialen]

1 nm = 1,852 m

1/60 graad

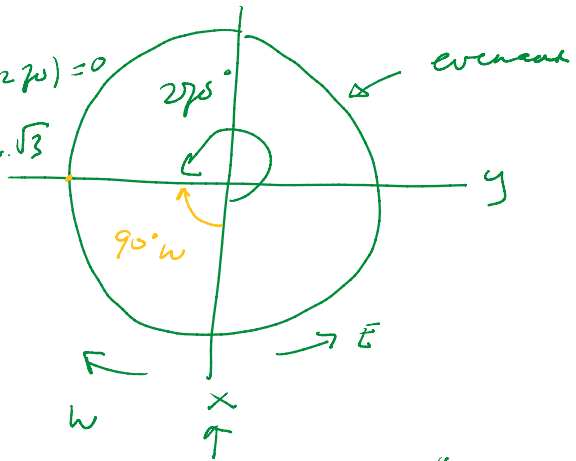
gegeven positie New Orleans 30°N / 90°W

xyz ? $\rho = 4000$ miles

$x = \rho \cdot \sin\phi \cdot \cos\theta = 4000 \cdot \sin 60 \cdot \cos(270) = 0$

$y = \rho \cdot \sin\phi \cdot \sin\theta = 4000 \cdot \frac{1}{2}\sqrt{3} \cdot (-1) = -2000\sqrt{3}$

$z = \rho \cdot \cos\phi = 4000 \cdot \frac{1}{2} = 2000$

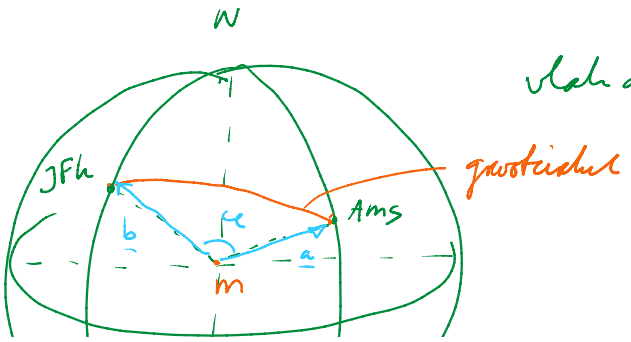


$\lambda = 90°\,W \rightarrow \theta = 270°$

$\varphi = 30°N \rightarrow \phi = 90° - 30° = 60°$

greenwich 0° E
0° W

NO: $(x, y, z) = (0, -2000\sqrt{3}, 2000)$

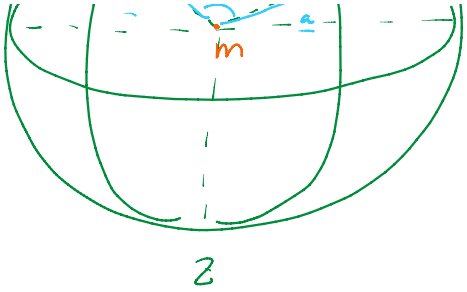


Vlak door JFk en Ams en middelpunt Aarde

$(\underline{a}, \underline{b}) = |\underline{a}| \cdot |\underline{b}| \cdot \cos\varphi$

$|\underline{a}| = 1$

$|\underline{x}|$



$\underline{a} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$

$\varphi \rightarrow 1° = 60\,nm$

hoch ⟶ Abstand