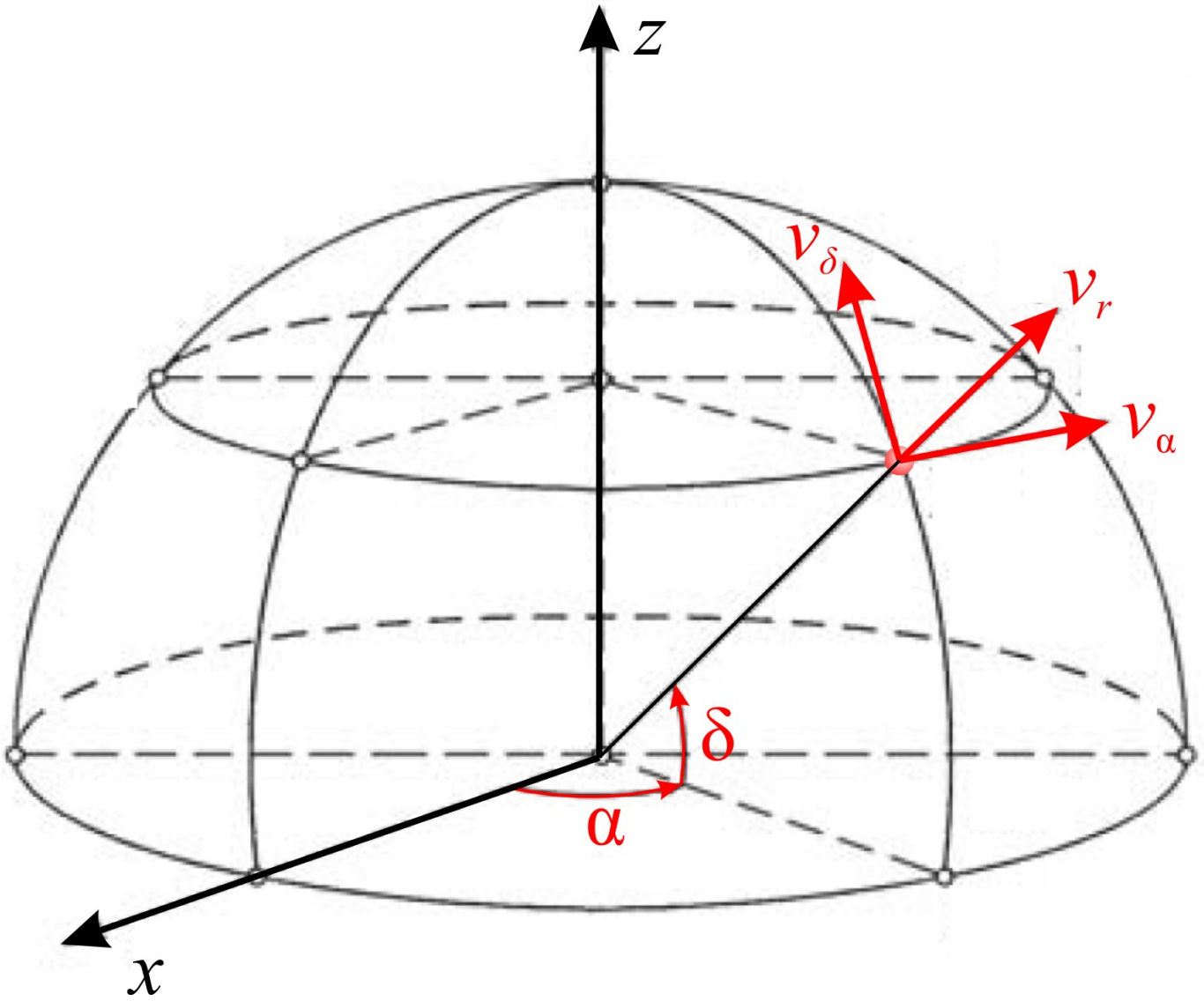
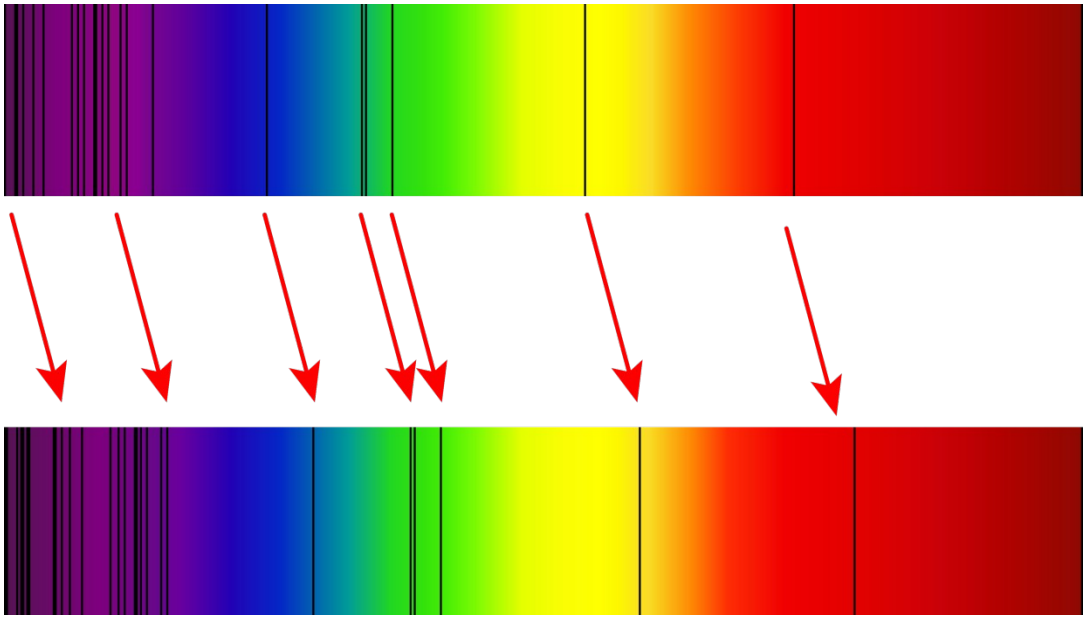
Sopstveno kretanje

Kretanje zvezda

Od čega zavisi brzina pomeranja zvezde po nebeskoj sferi?



Radijalne brzine



Doplerov efekat

$$\frac{\Delta\lambda}{\lambda} = \frac{\lambda' - \lambda}{\lambda} = z$$

Klasičan slučaj

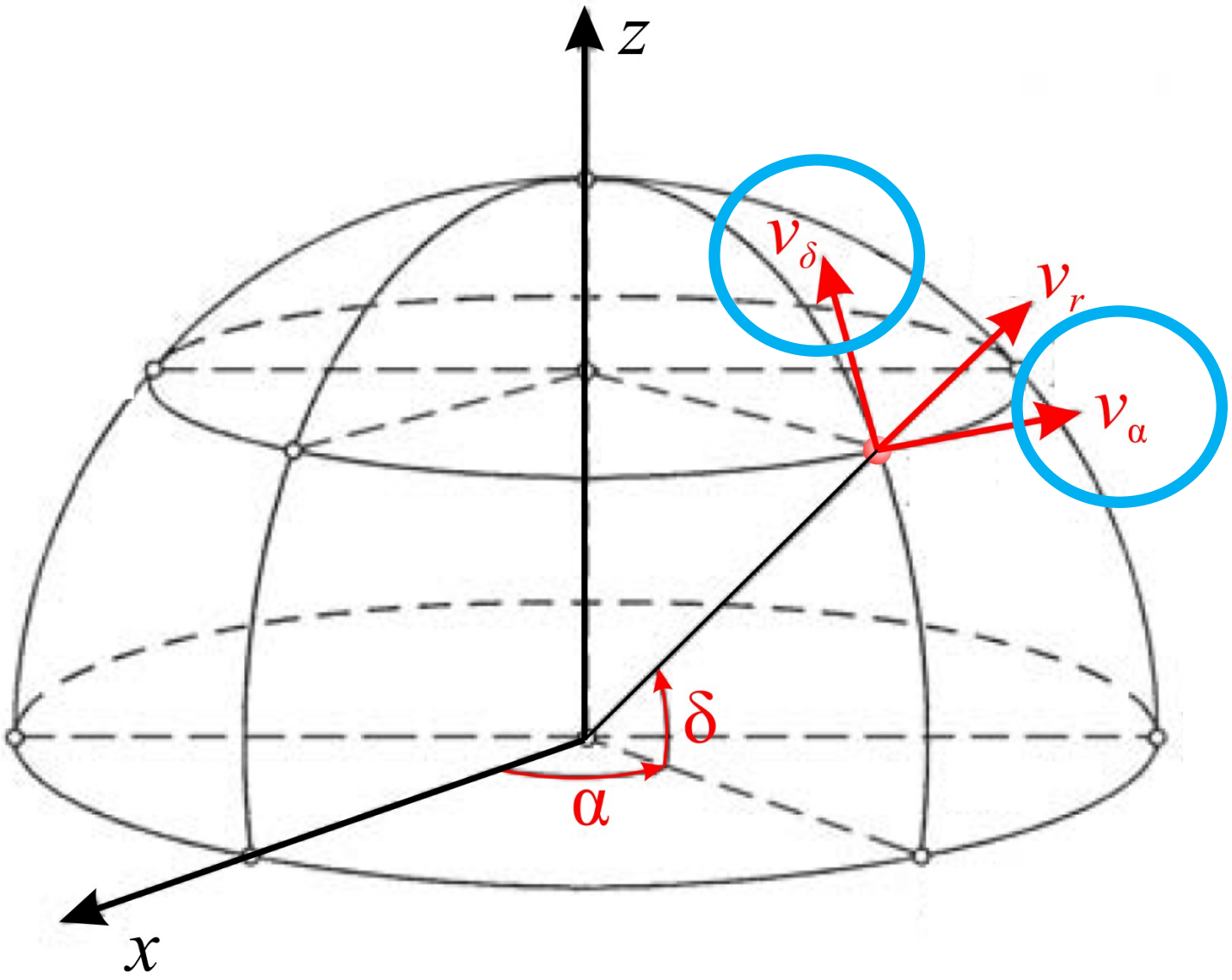
$$v_r = c\frac{\Delta\lambda}{\lambda}$$

Relativistički slučaj

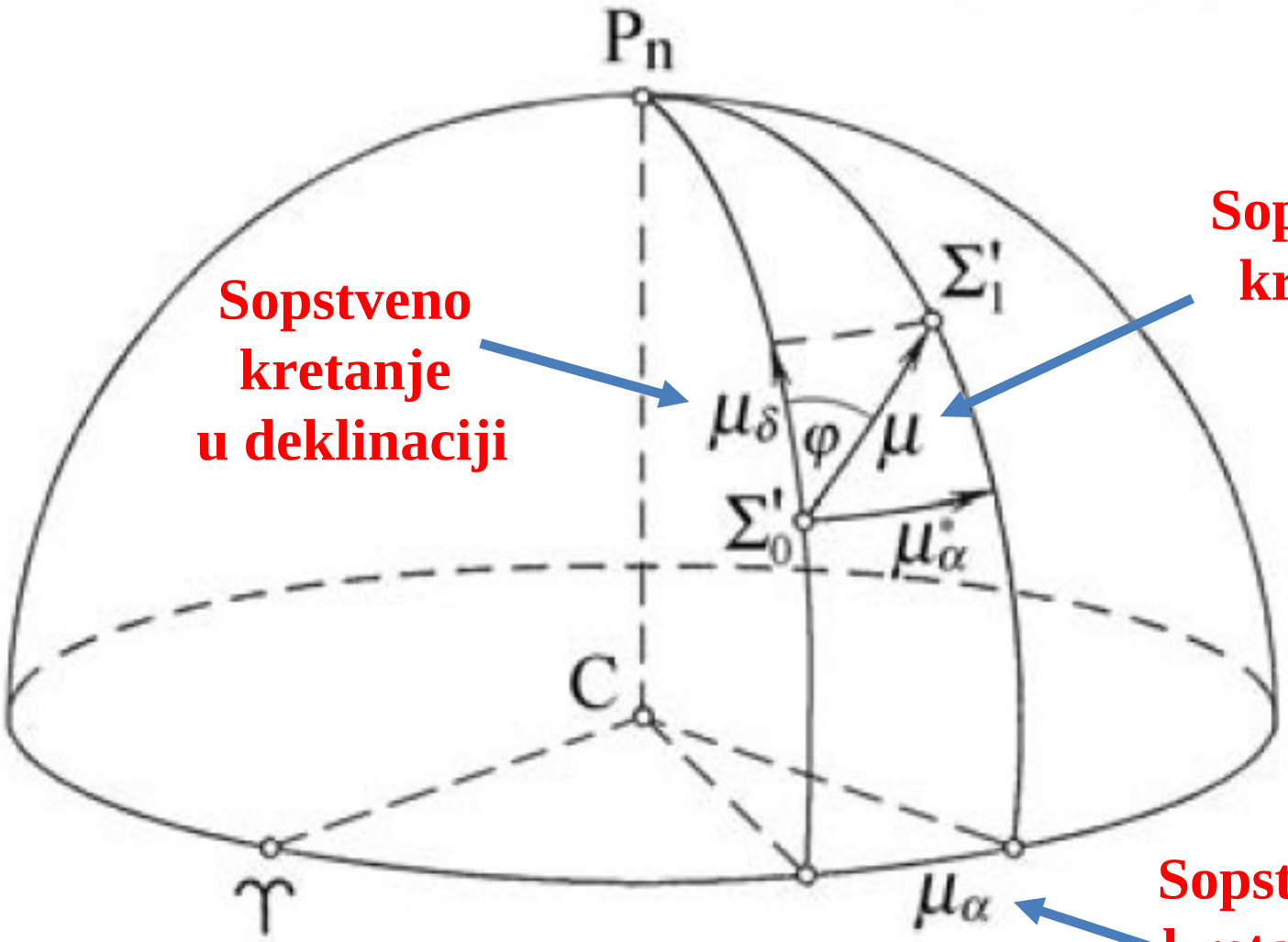
$$\beta = \frac{(1+z)^2 - 1}{(1+z)^2 + 1}$$

$$v_r = \beta c$$

Tangencijalne brzine



Sopstveno kretanje



Sopstveno kretanje u deklinaciji

Sopstveno kretanje

$$\mu\left[\frac{''}{god}\right]$$

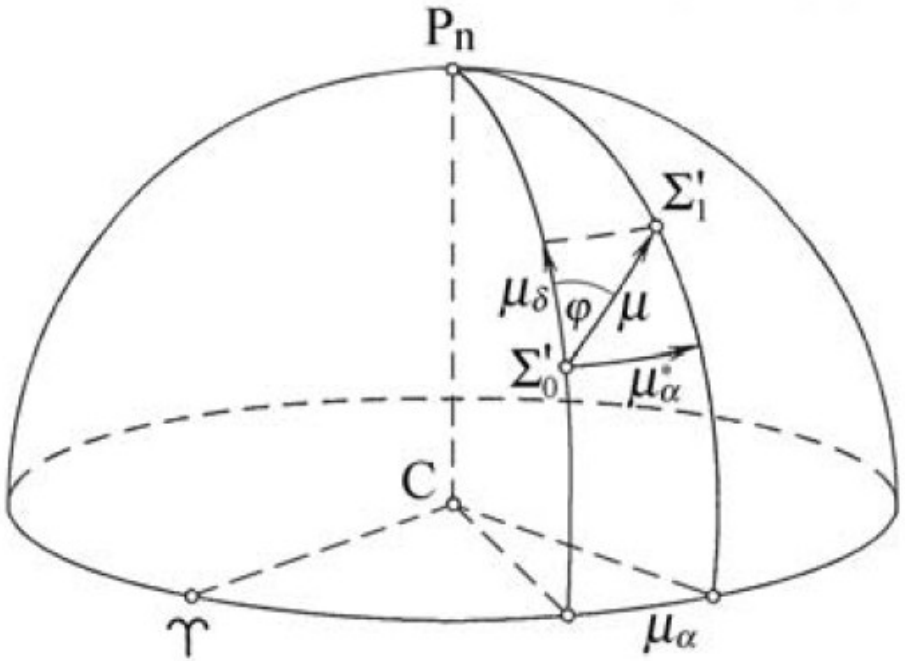
Sopstveno kretanje u rektascenziji

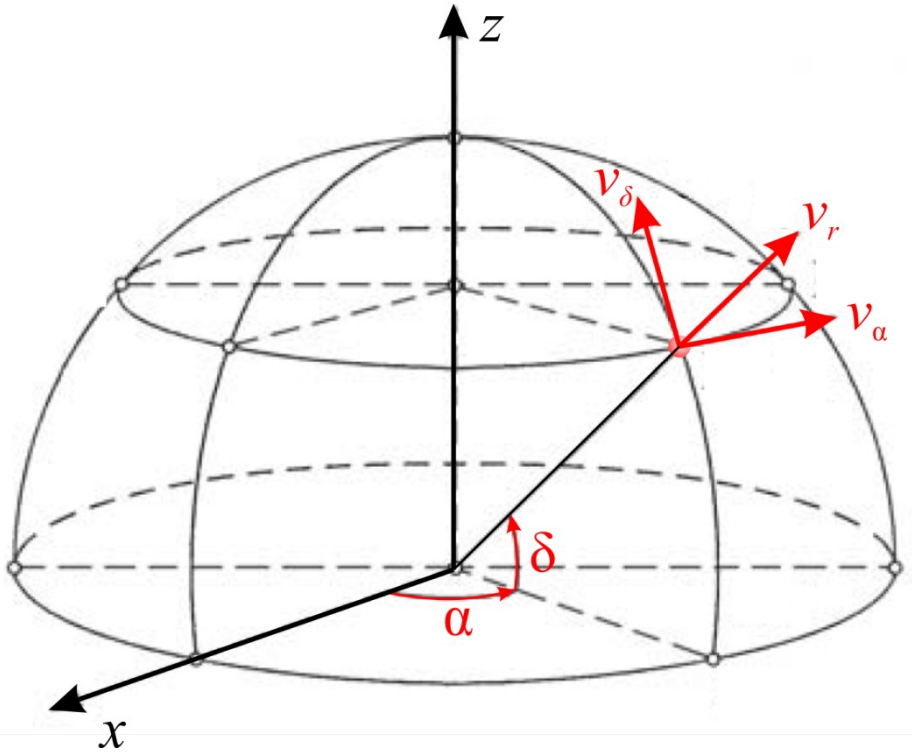
Ukupno sopstveno kretanje

$$\mu^2=\mu_\delta^2+\mu_\alpha^{*2}=\mu_\delta^2+(\mu_\alpha\cos\delta)^2$$

Sopstveno kretanje

Kako su povezani sopstveno kretanje i tangencijalne brzine?

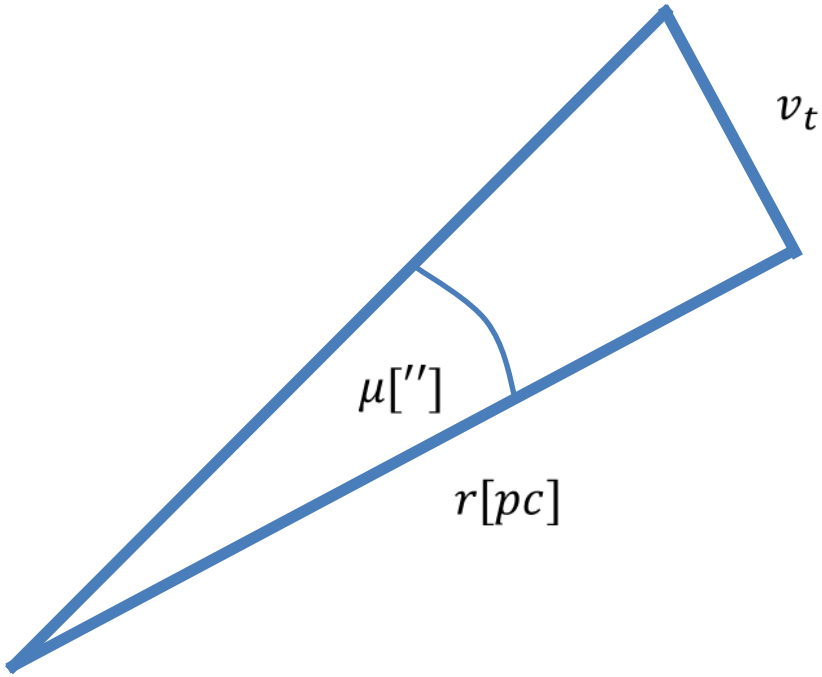




$$\mu\left[\frac{''}{god}\right] \qquad v\left[\frac{km}{s}\right]$$

Sopstveno kretanje

Kako su povezani sopstveno kretanje i tangencijalne brzine?

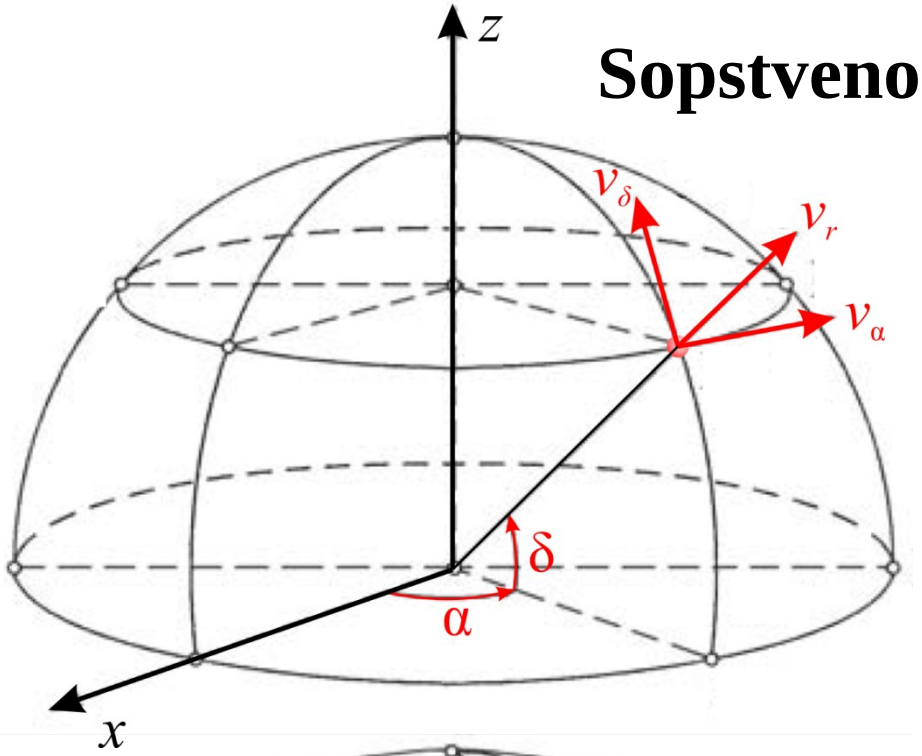


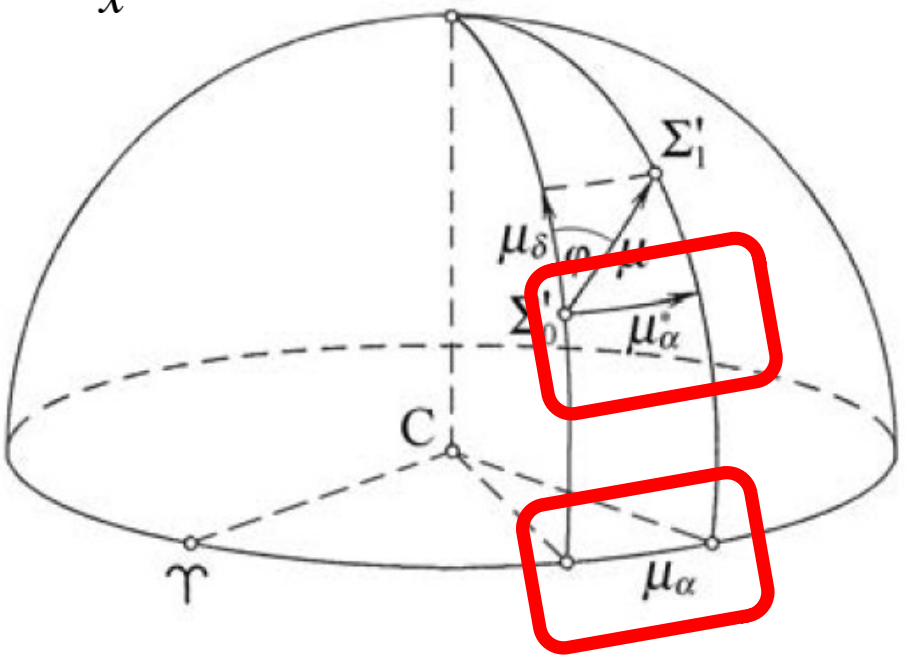
$$v_t \cdot 1 \left[\frac{km \cdot god}{s}\right] = r[pc] \cdot \mu[''] = r\mu[AJ]$$

$$v_t \left[\frac{km}{s}\right] = r\mu \left[\frac{AJ}{god}\right] = \frac{\mu}{\pi} \frac{149600000}{31557600} \left[\frac{km}{s}\right]$$

$$\boldsymbol{v_t = 4.74 \frac{\mu}{\pi}}$$

Sopstveno kretanje





Barnardova zvezda!

$$v_\delta = 4.74 \frac{\mu_\delta}{\pi}$$

?

$$v_\alpha = 4.74 \frac{\mu_\alpha \cdot \cos\delta}{\pi}$$

$$\mu_\alpha^* = \mu_\alpha \cos\delta$$