východy a západy

$$\sin A \cos h = \cos\delta \sin t \qquad (1)$$

$$\cos A \cos h = -\cos\varphi \sin\delta + \sin\varphi \cos\delta \cos t \qquad (2)$$

$$\sin h = \sin\varphi \sin\delta + \cos\varphi \cos\delta \cos t \qquad (3)$$

$t_{v,z}$

$h = 0 \quad (3) \Rightarrow \boxed{\cos t_{v,z} = -\operatorname{tg}\varphi \operatorname{tg}\delta}$

$\delta = 0 \Rightarrow t_{v,z} = \pm 6h$

$A_{v,z}$

$h = 0 \quad (2) \Rightarrow \cos A = -\cos\varphi \sin\delta - \sin\varphi \cos\delta \dfrac{\sin\varphi \sin\delta}{\cos\varphi \cos\delta}$

$$\cos A_{v,z} = -\cos\varphi \sin\delta - (1 - \cos^2\varphi)\frac{\sin\delta}{\cos\varphi}$$

$$\boxed{\cos A_{v,z} = -\frac{\sin\delta}{\cos\varphi}}$$

$\delta = 0 \Rightarrow A_{v,z} = \pm 90^\circ$

kulminace

$t = 0h \quad (3) \Rightarrow \quad \sin h_I = \cos(\varphi - \delta)$

$$\sin h_I = \sin(90° - \varphi + \delta)$$

$t = 12h \quad (3) \Rightarrow \quad \sin h_{II} = -\cos(\varphi + \delta)$

$$\sin h_{II} = \sin(\varphi + \delta - 90°)$$