Csillagász II. Beadandó

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UXB261

1.1/1.

Dátum: 2017.12.27

Idő: 14:00 LT $\xrightarrow{\text{téli idő}}$ 13:00 UT

Hely: Szombathely (47,2307 N ; 16,6218 E)

GMST(S_0): $6^h 22^m 41^s = 6{,}3780\dot{5}^h$

$$S = S_0 + \Delta\lambda^h + \frac{ds}{dm}\,UT \qquad \frac{ds}{dm} \approx \frac{86400}{86164}$$

$$S = 6{,}3780\dot{5} + \frac{16{,}6218}{15} + \frac{86400}{86164}\cdot 13 = 20{,}52178$$

$$S = 20^h\, 31^m\, 18{,}4^s$$

1.1/2.

Hely: Szeged (46,2530 N ; 20,1414 E)

Vénusz: $\alpha_V = 18{,}698\dot{3}^h$

$\delta = -24{,}0691\dot{6}^\circ$

$m = 0$: mikor? A = ?

LHA:

$$\cos(H_V) = \frac{\sin(m_V) - \sin(\delta_V)\cdot\sin(\varphi)}{\cos(\delta_V)\cdot\cos(\varphi)} \overset{m=0}{=} -\operatorname{tg}(\delta_V)\operatorname{tg}(\varphi)$$

$$H_V \begin{cases} 117{,}8172^\circ & \leftarrow \text{nyugvás} \quad (+) \\ -117{,}8172^\circ \; (= 242{,}18^\circ) & \leftarrow \text{kelés} \quad (-) \end{cases}$$

Kelés: $t_k = \frac{H_{rk}}{15} = -\frac{117,8172}{15} \rightarrow 16,14552^h$

Azimut:

$$1.\ \sin(A) = -\frac{\sin(H)\cdot\cos(\delta)}{\cos(m)} \overset{m=0}{=} -\sin(H)\cos(\delta)$$

$$2.\ \cos(A) = \frac{\sin(\delta) - \sin(\varphi)\sin(m)}{\cos(\varphi)\cos(m)} = \frac{\sin(\delta)}{\cos(\varphi)}$$

$1.\ A_k < \begin{matrix} 53,856° \\ 126,143° \end{matrix}$ $\quad 2.\ A_k < \begin{matrix} 126,143° \\ 233,856° \end{matrix}$

$$\boxed{A_k = 126,143°}$$

Nyugvás:

$$t_{ny} = \frac{H_{rny}}{15} = \frac{117,8172}{15} \rightarrow 7,85448^h$$

Azimut:

$$1.\ \sin(A) = -\sin(H)\cos(\delta)$$

$$2.\ \cos(A) = \frac{\sin(\delta)}{\cos(\varphi)}$$

$1.\ A_{ny} = \begin{matrix} -53,856° \\ 233,856° \end{matrix}$ $\quad 2.\ A_{ny} = \begin{matrix} 126,143° \\ 233,856° \end{matrix}$

$$\boxed{A_{ny} = 233,856°}$$

Eltelt idő: $24 - (16,14552^h - 7,85448)^h = \boxed{15,70896^h}$

1.113.

Dátum: 2018.12.22

Hely: Punkelstelő (37,91806 N; 19,8942 E)

Nap: $\alpha = 18^h$

$\delta = -23{,}45^\circ$

$GMST(S_0) = 6^h$

$m = -18^\circ$

$$\cos(H_\odot) = \frac{\sin(m_\odot) - \sin(\delta_\odot)\sin(\varphi)}{\cos(\delta_\odot)\cdot\cos\varphi}$$

$$H_\odot = \begin{cases} 91{,}2735^\circ & \to \oplus: \text{este} \\ -91{,}2735^\circ & \to \ominus: \text{hajnal} \end{cases}$$

$t_{este} = 6{,}0849^h$

$t_{hajnal} = 17{,}9151^h$

$\boxed{t_{éjszaka} = t_{hajnal} - t_{este} = 11{,}8302^h}$

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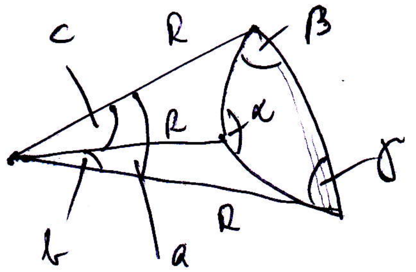
1.2/1.



$a = 57°22'$

$b = 72°12'$

$\gamma = 94°1'$

Vektoralgebrai képletek:

$$c = \operatorname{arctg}\left\{\frac{\sqrt{(\sin(a)\cos(b) - \cos(a)\sin(b)\cos(\gamma))^2 + (\sin(b)\sin(\gamma))^2}}{\cos(a)\cos(b) + \sin(a)\sin(b)\cos(\gamma)}\right\}$$

$0° < c < 180°$

$$\boxed{c = 82{,}43263°}$$

$$\alpha = \operatorname{arctg}\left\{\frac{\sin(a)\sin(\gamma)}{\sin(b)\cos(a) - \cos(b)\sin(a)\cos(\gamma)}\right\}$$

$0° < \alpha < 180°$

$$\boxed{\alpha = 54{,}81277°}$$

$$\beta = \operatorname{arctg}\left\{\frac{\sin(b)\sin(\gamma)}{\sin(a)\cos(b) - \cos(a)\sin(b)\cos(\gamma)}\right\}$$

$0° < \beta < 180°$

$\beta = 73{,}1925°$

1.2/2.

Hely: Baja (46,1803 N; 19,0111 E)

Altair: $\alpha = 19{,}8625^h$

$\delta = 8{,}92278^\circ$

GMST (S_0): ~~$8^h 47^m 12^s$~~ =

$17^h 57^m 19^s = 17{,}9553^h$

Idő: 20:45 LT → 18:45 UT

Dátum: ~ 2013.06.21 → nyári időszámítás

$$S = S_0 + \Delta\lambda^h + \frac{ds}{dm} \cdot UT \qquad \frac{ds}{dm} \approx \frac{86400}{86164}$$

$$S = 17{,}9553^h + \left(\frac{19{,}0111}{15}\right)^h + 1{,}0027379 \cdot 18{,}75^h$$

$$S = 14{,}02404^h$$

$$t = S - \alpha \rightarrow t = 18{,}1615^h \rightarrow H = 15t = $$
$$= 272{,}423^\circ$$

Magasság (m):

$m \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

$$\sin(m) = \sin(\delta) \cdot \sin(\varphi) + \cos(\delta) \cdot \cos(\varphi) \cdot \cos(H)$$

egyértelmű az arcsin

$$m = 8{,}08805^\circ$$

Azimut (A) :

$A \in [0, 2\pi[$

1. $\sin(A) = \dfrac{-\sin(H) \cdot \cos(\delta)}{\cos(h)}$ — $85{,}51035^\circ$ / $94{,}48965^\circ$

2. $\cos(A) = \dfrac{\sin(\delta) - \sin(\varphi)\sin(h)}{\cos(\varphi)\cos(h)}$ — $85{,}5163^\circ$ / $-85{,}5163$

$$\boxed{A \approx 85{,}51^\circ}$$

1.2./3.

Dátum: 2018.04.17.

Idő: $20^h 34^m 53^s$ LT

Hely: Rio $(-22{,}9068 N, -43{,}1729 E)$

GMST (S_0): $\underline{13^h 40^m 18^s}$

$\boxed{\text{nyári idő} \xrightarrow{\quad} \ z = -3 \text{ télen}}$ $22^h 34^m 53^s$

Rosszul van megadva a beadandók feladatai között!!!!

$$S = S_0 + \Delta\lambda^h + \frac{ds}{dm} UT$$

$$S = 13{,}6716^h + (-1{,}52712^h) + \frac{86400}{86164} \cdot 22{,}5814^h$$

$$\boxed{S = 09:26:12 \Rightarrow 9^h 26^m 12^s}$$

Csillag: $m = 55{,}656388°$

$A = 208{,}113611°$

Deklináció (δ):

$$\sin(\delta) = \sin(m) \cdot \sin(\varphi) + \cos(m) \cos(\varphi) \cdot \cos(A)$$

$$\boxed{\delta = -51° 14' 9''}$$

+ Rektaszcenzió (α):

1, $\sin(H) = \dfrac{-\sin(A) \cdot \cos(m)}{\cos(\delta)}$; 2, $\cos(H) = \dfrac{\sin(m) - \sin(\delta)\sin(\varphi)}{\cos(\delta)\cos(\varphi)}$

$H = 25{,}1246°$ / $154{,}875°$

$H = 25{,}1247°$ / $-25{,}1247°$

$$t = \frac{H}{15} = 1{,}675^h \rightarrow \boxed{\alpha = S - t = 7{,}7617^h}$$