


**Tuleva keskipäiväsijainti**
**Alus ajaa Mer.pass. -paikalle, jolloin  $^{\circ}\text{LHA} = 360^{\circ}$** 

|                                                                                                                  |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------|----------|--------------------------|--------------------------|-------------------------|------------------|----------|----------|--------------------|---------|-------------------------|-------------------------|
| Auringon aamupäiväkorkeus                                                                                        |                            | DR <sub>1</sub> Merk.paikka | Lat $\varphi_1$ |                                                                                                                                                                                                                                                                                                                                                   | Ajoaika Mer.Pass. -paikalle =<br>Auringon kulku aika ( $\Delta t$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            | Aluksen liike |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  |                            |                             | Lon $\lambda_1$ |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               | Nopeus f |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| H <sub>i</sub> =                                                                                                 | Päivä                      | klo =                       | KrT =           |                                                                                                                                                                                                                                                                                                                                                   | $\leftrightarrow$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Suunta K                                   |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| ik =                                                                                                             |                            | klok =                      | krk =           |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ajoaika $\Delta t$                         |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| H <sub>h</sub> =                                                                                                 |                            | → ZT =                      | KrT =           |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\Delta t = (360^{\circ} - \text{LHA})/15$ |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| Dip =                                                                                                            |                            | zc =                        | 12h             |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | d =                                        |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| H <sub>a</sub> =                                                                                                 |                            | → UT                        | UT =            |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $^{\circ}\text{Dec} =$                     |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| Ork =                                                                                                            | GHA =                      | d: =                        |                 |                                                                                                                                                                                                                                                                                                                                                   | dk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            | Dec           |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\Delta R =$                                                                                                     | $k^{\text{ms}} =$          | Dec =                       |                 |                                                                                                                                                                                                                                                                                                                                                   | UT Mer.pass.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                            | DR Mer.pass.  |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| H <sub>t</sub> =                                                                                                 | vk =                       | $\pm dk =$                  |                 |                                                                                                                                                                                                                                                                                                                                                   | $\varphi_1 + (f \cdot \Delta t \cdot \cos K)/60 =$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            | Lat $\varphi$ |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| H <sub>L</sub> =                                                                                                 | GHA =                      | Dec =                       |                 |                                                                                                                                                                                                                                                                                                                                                   | $\lambda_1 + (f \cdot \Delta t \cdot \sin K)/(60 \cdot \cos \varphi_k) =$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            | Lon $\lambda$ |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\Delta H =$                                                                                                     | $\pm \lambda =$            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   | <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <math>\varphi</math> ja Dec samanmerkkiset </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><math>\varphi &gt;  \text{Dec} </math></td> <td><math>\varphi &lt;  \text{Dec} </math></td> </tr> <tr> <td>90° =</td> <td>H<sub>t</sub> =</td> </tr> <tr> <td>+ Dec  =</td> <td>+ Dec  =</td> </tr> <tr> <td>- H<sub>t</sub> =</td> <td>- 90° =</td> </tr> <tr> <td><math>\varphi_{\text{OP}} =</math></td> <td><math>\varphi_{\text{OP}} =</math></td> </tr> </table> |                                            |               |          | $\varphi >  \text{Dec} $ | $\varphi <  \text{Dec} $ | 90° =                   | H <sub>t</sub> = | + Dec  = | + Dec  = | - H <sub>t</sub> = | - 90° = | $\varphi_{\text{OP}} =$ | $\varphi_{\text{OP}} =$ |
| $\varphi >  \text{Dec} $                                                                                         | $\varphi <  \text{Dec} $   |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| 90° =                                                                                                            | H <sub>t</sub> =           |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| + Dec  =                                                                                                         | + Dec  =                   |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| - H <sub>t</sub> =                                                                                               | - 90° =                    |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\varphi_{\text{OP}} =$                                                                                          | $\varphi_{\text{OP}} =$    |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  | mpk                        | LHA =                       |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  |                            | $\pm 360^{\circ}$           |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  |                            | LHA =                       |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\sin H_L = \sin \text{Lat} \cdot \sin \text{Dec} + \cos \text{Lat} \cdot \cos \text{Dec} \cdot \cos \text{LHA}$ |                            |                             |                 | <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <math>\varphi</math> ja Dec erimerkkiset </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>90° =</td> </tr> <tr> <td>- Dec  =</td> </tr> <tr> <td>- H<sub>t</sub> =</td> </tr> <tr> <td><math>\varphi_{\text{OP}} =</math></td> </tr> </table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               | 90° =    | - Dec  =                 | - H <sub>t</sub> =       | $\varphi_{\text{OP}} =$ |                  |          |          |                    |         |                         |                         |
| 90° =                                                                                                            |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| - Dec  =                                                                                                         |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| - H <sub>t</sub> =                                                                                               |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\varphi_{\text{OP}} =$                                                                                          |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| $\cos Z = (\sin \text{Dec} - \sin \text{Lat} \cdot \sin H_L) / (\cos \text{Lat} \cdot \cos H_L)$                 |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
|                                                                                                                  |                            |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| Z =                                                                                                              | Zn=z kun LHA > 180°        |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |
| Zn =                                                                                                             | Zn = 360°-z kun LHA ≤ 180° |                             |                 |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |               |          |                          |                          |                         |                  |          |          |                    |         |                         |                         |

H<sub>t</sub> takaisinlaskenta  
  
(LHA = 360°)

Ajoaika Mer.Pass. -paikalle  
 $(360^{\circ} - \text{LHA}_1) / (15 + (f \cdot \sin K) / (60 \cdot \cos \varphi_k))$

$\odot$  Meridiaanikorkeus

|                       |
|-----------------------|
| H <sub>i</sub> =      |
| ik =                  |
| H <sub>h</sub> =      |
| Dip =                 |
| H <sub>a</sub> =      |
| $^{\circ}\text{rk} =$ |
| H <sub>t</sub> =      |