

Guide 9.0 Landmark offset RA: $0^{\circ}0800885$ DE $0^{\circ}06817$

Mondbewegung RA: $0^{\circ}0076/\text{min}$ DE: $0^{\circ}0032/\text{min}$

Difft zu PyEphem: $-0.^{\circ}06$ $-0.^{\circ}06$ ✓

MoonPanoramaMaker.log

2015-10-26 MoonPanoramaMaker 0.7.0

22:49:56.6 OperateTelescope thread initialized

22:49:57.9 MoonPanoramaMaker (re)started, de_center: 6.9101209574, pos_angle: -39.7470835419

22:50:14.6 ->Telescope was already connected

22:50:57.5 Set Moon center in planetarium program

22:50:58.6 Position look-up: RA: 23.8921737671, DE: 6.91100120544, iterations: 1

22:51:22.1 Center landmark in planetarium program

22:51:23.2 Position look-up: RA: 23.971953392, DE: 6.97906494141, iterations: 1

Landmark offset (RA): 4.78677749634, Landmark offset (DE): 4.08382415771

22:51:42.7 Center landmark in camera live view

22:51:48.2 Position look-up: RA: 23.9797639847, DE: 6.9824552536, iterations: 5

22:51:48.3 Computing new alignment, moon position: RA: 23.9169791025, DE: 6.91587332293 \Rightarrow Landm. RA: 23.99676 DE: 6.983937

RA(landmark): 23.9797639847, DE(landmark): 6.9824552536, RA correction: -1.0196845679, DE correction: -61".19 -5".33 ✓

-0.0889083172374

22:51:48.3 Translating center offset to telescope coordinates, moon position: RA: 23.9169796056, DE:

6.91587353238

22:51:48.3 Slew to Moon Limb

22:51:48.3 Slewing telescope to: RA: 23.6819106654, DE: 6.73435742857

22:52:02.4 Position look-up: RA: 23.6715245247, DE: 6.73423290253, iterations: 3 Difft RA: $-0.^{\circ}0104$ DE: $-0.^{\circ}00012$

22:52:13.9 Start/continue recording

Moving telescope to tile 0, RA offset: -0.0692372237179, DE offset: 0.29101898438

22:52:14.0 Translating center offset to telescope coordinates, moon position: RA: 23.9201860402, DE:

6.91721174239

22:52:14.1 Slewing telescope to: RA: 23.8339540737, DE: 7.20674892148

22:52:26.8 Position look-up: RA: 23.8234019279, DE: 7.2066450119, iterations: 1 -0.0105 -0.00010

22:52:41.8 Start/continue recording

Moving telescope to tile 1, RA offset: 0.0166215518786, DE offset: 0.284527874114

22:52:41.9 Translating center offset to telescope coordinates, moon position: RA: 23.9236698627, DE:

6.91866563288

22:52:42.0 Slewing telescope to: RA: 23.9232966718, DE: 7.2017117017

22:52:54.2 Position look-up: RA: 23.9127731323, DE: 7.20158100128, iterations: 1 -0.0105 -0.00013

22:52:54.4 Start/continue recording

Moving telescope to tile 2, RA offset: 0.0816671965757, DE offset: 0.260854183485

22:52:54.4 Translating center offset to telescope coordinates, moon position: RA: 23.9252296663, DE:

6.91931655006

22:52:54.5 Slewing telescope to: RA: 23.9899021201, DE: 7.17868892825

22:53:06.3 Position look-up: RA: 23.9792490005, DE: 7.17866420746, iterations: 1 -0.0107 -0.00002

22:53:26.1 Select focus area

22:53:44.7 Position look-up: RA: 23.8165140152, DE: 7.16267824173, iterations: 1

22:54:03.4 Goto focus area

22:54:03.4 Translating center offset to telescope coordinates, moon position: RA: 23.9338269284, DE:

MoonPanoramaMaker.log

6.92290390284
22:54:03.4 Slewing telescope to: RA: 23.8188365547 , DE: 7.16364730137
22:54:16.3 Position look-up: RA: 23.8082528114 , DE: 7.16340780258 , iterations: 2 -0.0106 -0.00024
22:54:24.5 Start/continue recording
Moving telescope to tile 2 , RA offset: 0.0816671965757 , DE offset: 0.260854183485
22:54:24.6 Translating center offset to telescope coordinates, moon position: RA: 23.9364731598 , DE:
6.92400796722
22:54:24.7 Slewing telescope to: RA: 24.0011456136 , DE: 7.18338034541
22:54:38.6 Position look-up: RA: 23.9906001091 , DE: 7.18319177628 , iterations: 3 -0.0105 -0.00019
22:54:45.9 Translating center offset to telescope coordinates, moon position: RA: 23.9391213155 , DE:
6.92511277495
22:54:45.9 Slew to alignment point
22:54:46.0 Slewing telescope to: RA: 24.0019061976 , DE: 6.99169470562
22:54:59.9 Position look-up: RA: 23.9913725853 , DE: 6.99159622192 , iterations: 3
22:55:15.1 Center landmark in camera live view
22:55:18.2 Position look-up: RA: 24.0065217018 , DE: 6.99318408966 , iterations: 3
22:55:18.2 Computing new alignment, moon position: RA: 23.9431536962 , DE: 6.92679496374
RA(landmark): 24.0065217018 , DE(landmark): 6.99318408966 , RA correction: -0.984697159898 , DE correction:
-0.100476602353
Computing drift rate using alignment points 0 and 1 . Drift in Ra: 0.59978413716 , drift in De: -0.198313459122
Enter compute_drift
Start drift computation, first/last index: 0 1
Computing drift rate using alignment points 0 and 1 . Drift in Ra: 0.59978413716 , drift in De: -0.198313459122
22:55:40.4 Terminating telescope
22:55:40.4 Ending OperateTelescope thread
22:55:40.4 Telescope terminated

26.10.2015

264.325.02
1.320.33

271.19

3,478 Pixel / "

363,237
1.033,901

943,3 Pixel

20.53:44

21.34:59

3.4 % Abn.

$$\frac{0.013}{\text{ss. } 1"} = f \cdot \cancel{\text{ss. } 1"} \quad \text{mm}$$

$$1 \text{ Pixel} = 3.89 \mu\text{m}$$

$$1280 \times 960 = 4.98 \times 3.73 \text{ mm} \\ 6.22 \text{ mm} \quad (6)$$

1.11.2014:

305.45

239,821
1.199,323

1772.4 Pixel

Primärblatt:

$$\Rightarrow 1 \text{ Pixel} = 3.86 \mu\text{m}$$

$$3.511 \text{ Pixel / "}$$

Balken:

152.32

219,145
1.051,429

879.14 Pixel

Faktor:

1.64

$$5.772 \text{ Pixel / "}$$

565,68

351,220

f = 2794 mm

395,746

399,636

$\approx 3.87 \mu\text{m}$ Pixel Pfeil

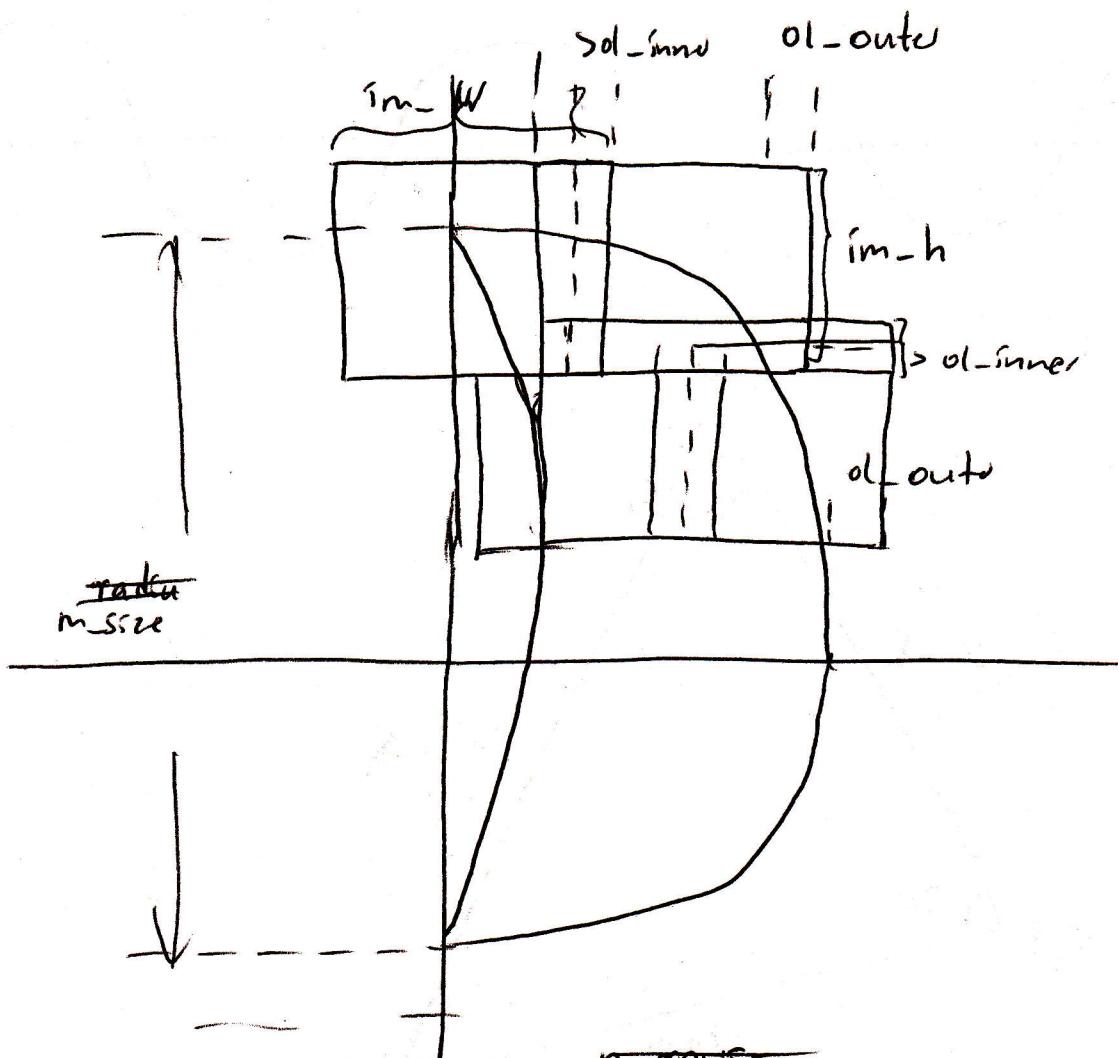
698 P

418,76

~~Akt~~ ~~3.5~~ Pixel / "

Faktor: 1.67

T ..



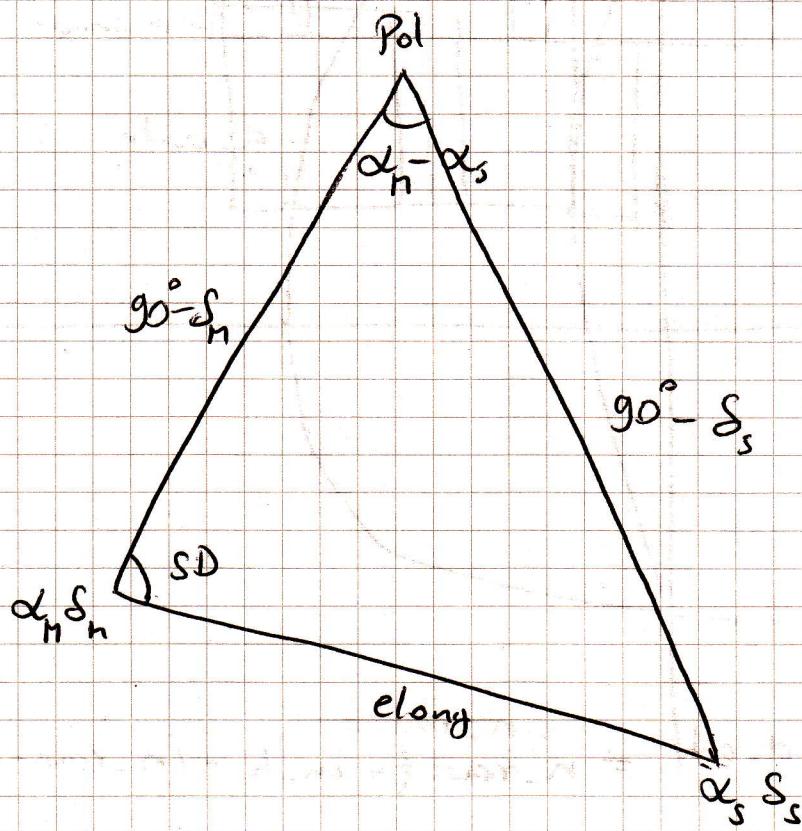
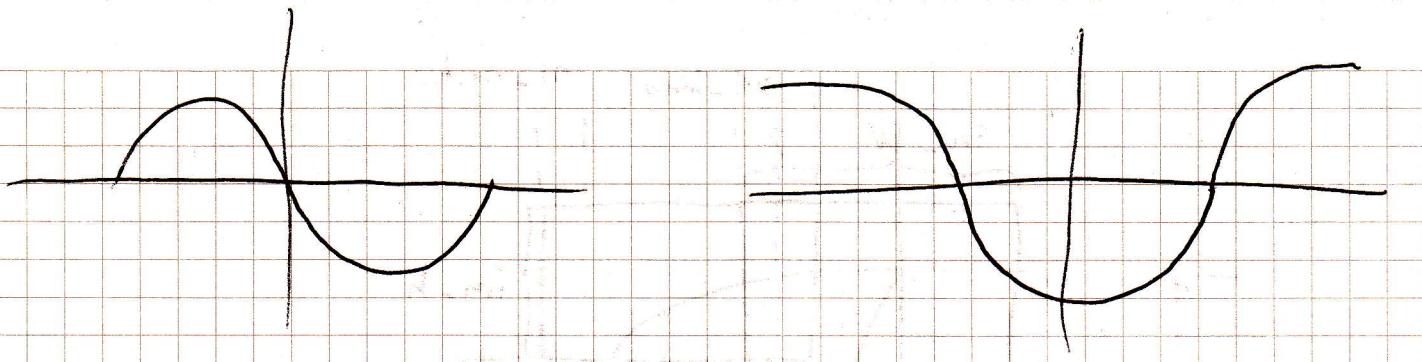
$$\begin{aligned}
 m_size + 2 \times ol_outer &= n_{\text{rows}} \cancel{\times im_h} - (n_{\text{rows}} - 1) \times ol_inner \\
 &= n_{\text{rows}} (im_h - ol_inner) + ol_inner
 \end{aligned}$$

$$n_{\text{rows}} = \frac{m_size + 2 \times ol_outer - ol_inner}{im_h - ol_inner}$$

$$35 = 11.\overline{3} \times 14.\cancel{+10.}\overline{3} - 10.\overline{3} \times 1$$

$$\cancel{(n_{\text{rows}} + 1)} \times ol_inner = \frac{n_{\text{rows}} \times im_h - m_size + 2 \times ol_outer}{n_{\text{rows}} - 1}$$

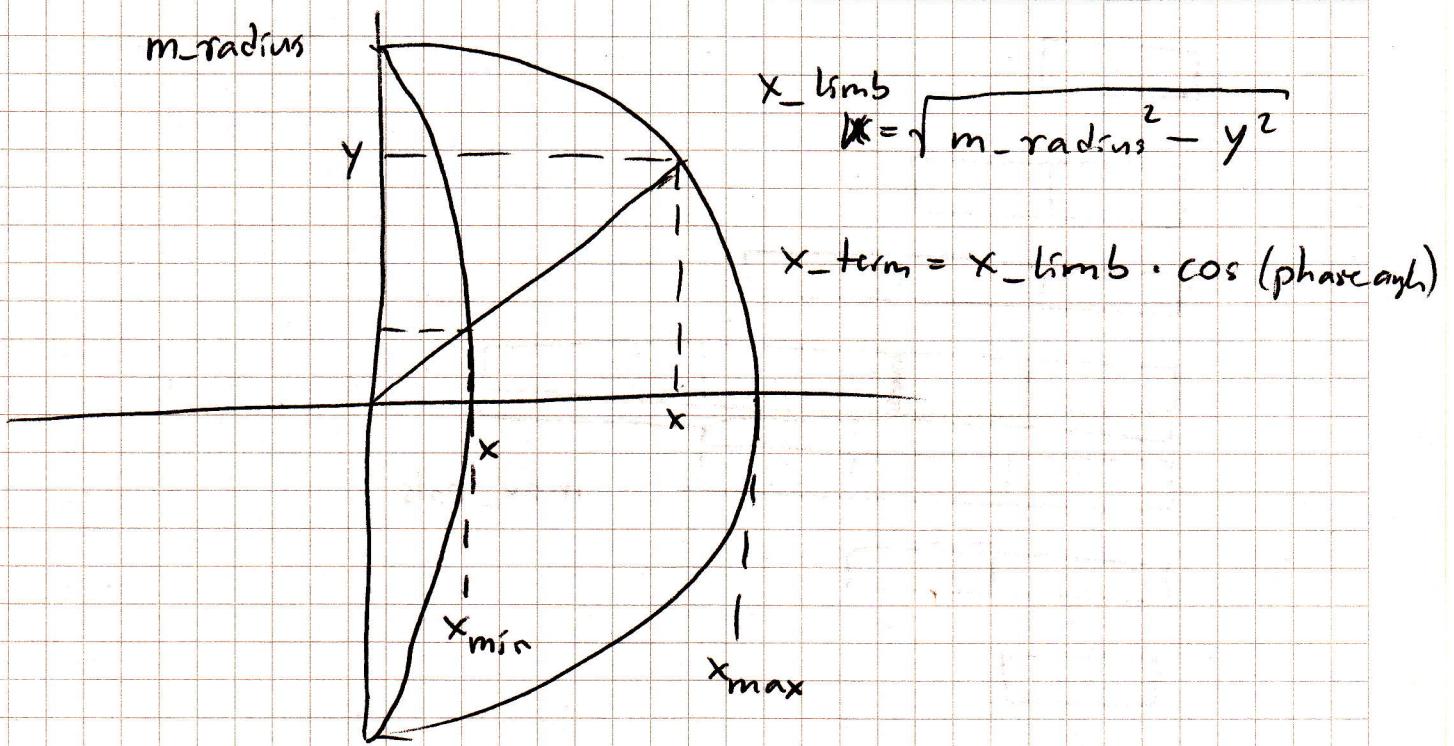
368 592



$$\frac{\sin SD}{\sin (90^\circ - \delta_s)} = \frac{\sin \text{elong}}{(\alpha_m - \alpha_s)} (90^\circ - \delta_s)$$

$$\cos SD = \frac{\cos (90^\circ - \delta_s) \sin (90^\circ - \delta_m) - \sin (90^\circ - \delta_s) \cos (90^\circ - \delta_m) \cos (\alpha_m - \alpha_s)}{\sin \text{elong}}$$

$$\cos SD = \frac{\sin \delta_s \cos \delta_m - \cos \delta_s \sin \delta_m \cos (\alpha_m - \alpha_s)}{\sin \text{elong}}$$

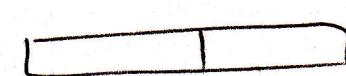
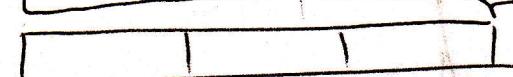
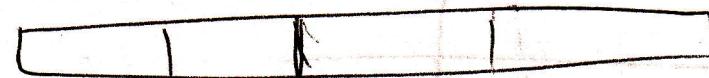
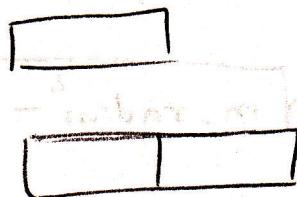


$$\begin{aligned}
 & \text{#} \quad x_{\max} - x_{\min} + 2 \cdot \text{ol_outer} = n_{\text{cols}} \times \text{im_w} - (n_{\text{cols}} - 1) \times \text{ol_inner} \\
 & \qquad \qquad \qquad = n_{\text{cols}} \times (\text{im_w} - \text{ol_inner}) + \text{ol_inner}
 \end{aligned}$$

$$n_{\text{cols}} = \frac{x_{\max} - x_{\min} - \text{ol_inner}}{\text{im_w} - \text{ol_inner}}$$

$$\text{ol_inner_h} = \frac{n_{\text{cols}} \times \text{im_w} - x_{\max} + x_{\min} - 2 \times \text{ol_outer}}{n_{\text{cols}} - 1}$$

T ..



max_cols

limb_first = {True
False}

width + (width - limb_width) * 2

width - 2 * limb_width - 2 * 10

width - 2 * 10 = 100

width - 2 * 10 = 100 = width - 2 * limb_width

100 = 100

09.31:36

M:50:39

(Pyus: c4)

20.24.14
21.03.23

780 994

300 450

q¹-V1rs.t.a

0. 67408 N 23.47297 E

-618 -1121
-926 -236
3648 414

P₁ 50.74246 7.33477

2824

P₂ 50.74349 7.34081~~542.814~~ -0.4013.06. 21^h44^m.50^s
29.06. 21^h48^m.30^s

309.993 -0.4

~~342.553~~ -0.41

309.403 -0.40

Punkt 2

8.6. 21^h41^m.30^s
3.7. 21^h47^m.00^s

Oberschr. rnk 50.8899 7.2029 167m

288.483 -0.43

2015 { 24. Apr. 20^h32^m.5
18. April 20^h29:482016 17. Apr. 20^h30^m

T ..

21 30 13

21 31 n

3490

21 33 04

34 01

3370

21 32 17 8°

21 13 34

21 14 29

3202

21 13 41

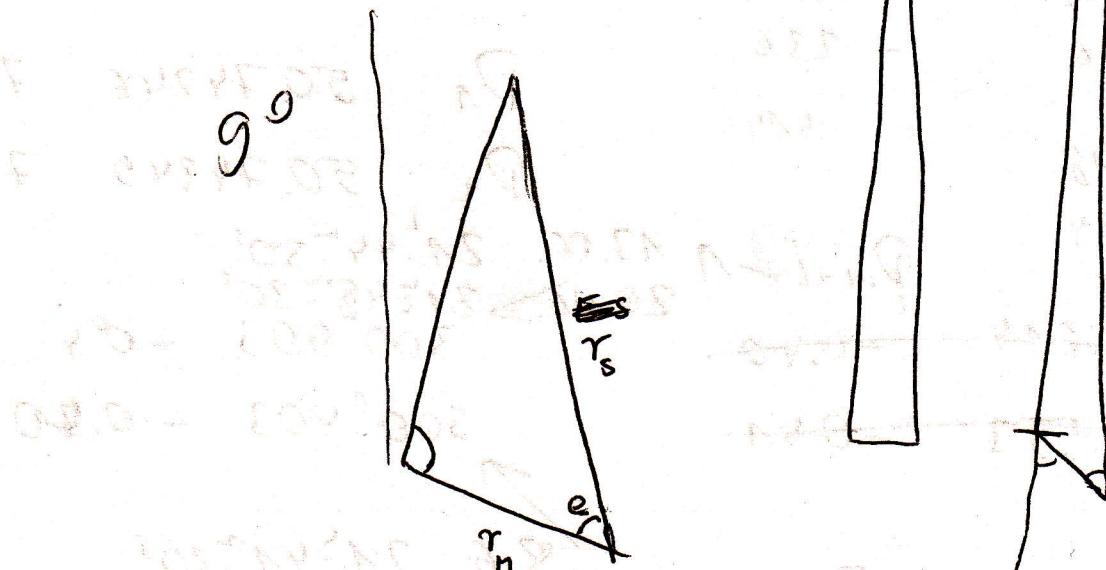
21 10 33

3071

$$\begin{array}{r} 20 \ 55.6 \\ 20 \ 57.8 \\ \hline 56.7 \end{array}$$

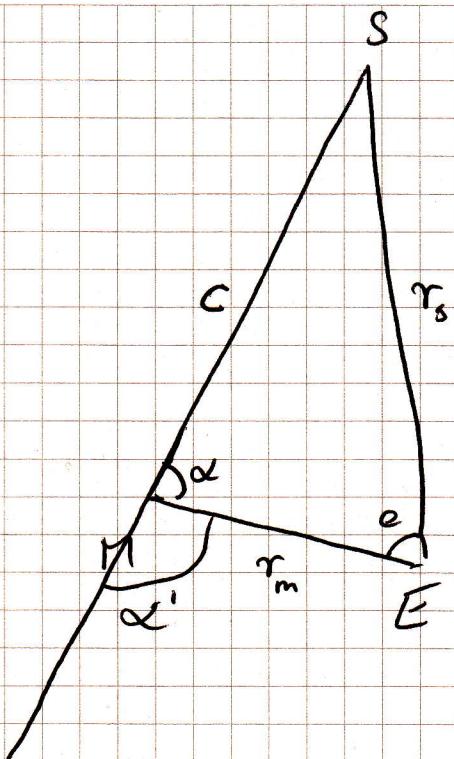
2823

3212



Berechnung des
Phasenwinkels α'

$$c = \sqrt{r_s^2 + r_m^2 - 2r_s r_m \cos \epsilon'}$$



$$\frac{\sin \alpha}{r_s} = \frac{\sin \epsilon}{c}$$

$$\sin \alpha = r_s \frac{\sin \epsilon}{c}$$

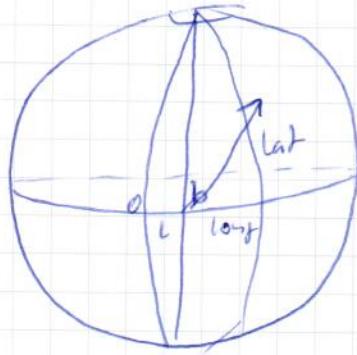
$$\alpha' = 180^\circ - \alpha$$

π
Phasenwinkel

$$\sin \alpha = \sin \alpha'$$

$$r_s^2 = c^2 + r_m^2 - 2cr_m \cos \alpha$$

$$\cos \alpha = \frac{c^2 + r_m^2 - r_s^2}{2cr_m}$$

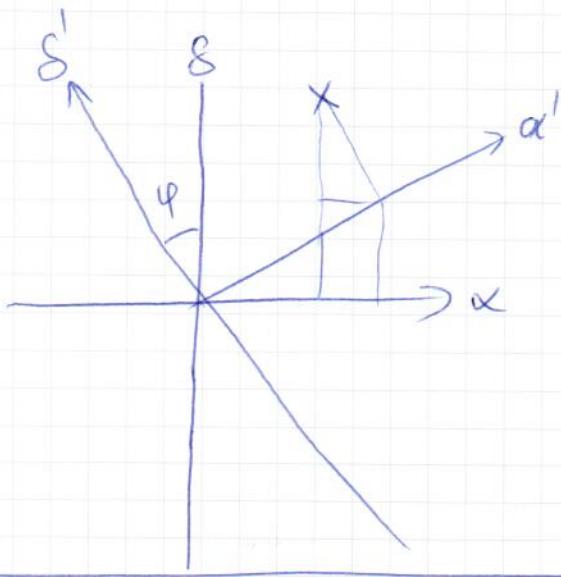
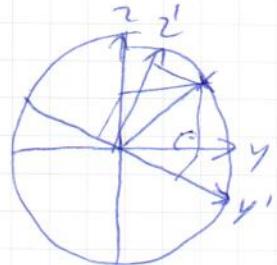


$$\left. \begin{aligned} da' &= -\sin(\text{long} - l) \cos(\text{lat}) \\ y &= -\cos(\text{long} - l) \cos(\text{lat}) \\ z &= \sin(\text{lat}) \end{aligned} \right| \cdot r$$

~~$x = x$~~

$$y' = y \cdot \frac{\cos b}{\sin b} - z \sin b$$

$$dd' x' = y \sin b + z \cos b$$



$$\begin{aligned} da &= da' \cos C' + dd' \sin C' / \cos C' \\ dd &= da' \sin C' + dd' \cos C' \\ &\quad \uparrow \\ &\quad \text{Pos rot} \end{aligned}$$

$$\begin{aligned} da' &= -\sin(\lambda_L - l) \cos \varphi_L \cdot R_n \\ y &= -\cos(\lambda_L - l) \cos \varphi_L \cdot R_M \end{aligned}$$

$$z = \sin \varphi_L \cdot R_M$$

$$y' = y \cos b + z \sin b$$

$$dd' = y \sin b + z \cos b$$

$$\begin{aligned} \text{Offset } dx &= (da' \cos C' + dd' \sin C') / \cos S_n \\ ds &= -da' \sin C' + dd' \cos C' \end{aligned}$$

λ_L, φ_L : geogr. longitudo
and latitudo of
Landmark or Moon

dx, ds : Offset in right
ascension, dd
declination of
Landmark relative
to from Moon
center.

T ..