

Adjustment of local geodetic network

<http://www.gnu.org/software/gama/>

version: 1.7.09-svd / win32-msvc

Network description

 pplanner

General parameters of the adjustment

| Coordinates | xyz | xy | z |
|---------------|------|----|---|
| Adjusted | : 21 | 0 | 0 |
| Constrained * | : 21 | 0 | 0 |
| Fixed | : 2 | 0 | 0 |
| ----- | | | |
| Total | : 23 | 0 | 0 |

| | | | |
|-----------------------|-------|---------------------|---|
| Number of directions | : 39 | Number of bearings: | 9 |
| Zenith angles | : 39 | | |
| Slope distances | : 39 | | |
| Total of observations | : 117 | | |

| | | | |
|------------------------------|------|---------------------|-----|
| Number of project equations: | 117 | Number of unknowns: | 72 |
| Degrees of freedom | : 45 | Network defect | : 0 |

m0 apriori : 1.00
 m0' aposteriori: 0.05 [pvv] : 1.07618e-001

During statistical analysis we work

- with apriori standard deviation 1.00
- with confidence level 95 %

Maximal normalized residual 0.18 does not exceed critical value 1.96
 on significance level 5 % for observation #22
 <z-angle from="4003.00" to="5001.00" val="103.8853" stdev="3.0" />

Fixed points

| point | x | y | z |
|---------|-------------|------------|---------|
| 4002.00 | 1066259.991 | 848618.890 | 433.847 |
| 4010.00 | 1067052.929 | 848296.136 | 471.482 |

Adjusted coordinates

| i | point | approximate value | correction | adjusted value | std.dev | conf.i. |
|---------|-------|-------------------|------------|----------------|---------|---------|
| | | value | ==== | [m] | ==== | value |
| | | ==== | ==== | value | ==== | [mm] |
| 4001.00 | | | | | | |
| 1 | X * | 1066215.20200 | 0.00002 | 1066215.20202 | 2.1 | 4.1 |
| 2 | Y * | 848672.46300 | 0.00005 | 848672.46305 | 2.5 | 4.8 |
| 3 | Z * | 427.40800 | -0.00005 | 427.40795 | 0.4 | 0.9 |
| 4003.00 | | | | | | |

| | | | | | | |
|---------|-----|---------------|----------|---------------|-----|-----|
| 5 | X * | 1066281.11300 | -0.00002 | 1066281.11298 | 1.2 | 2.3 |
| 6 | Y * | 848508.29400 | -0.00003 | 848508.29397 | 1.2 | 2.4 |
| 7 | Z * | 438.71900 | -0.00005 | 438.71895 | 0.3 | 0.5 |
| 4004.00 | | | | | | |
| 18 | X * | 1066350.27100 | 0.00005 | 1066350.27105 | 2.1 | 4.0 |
| 19 | Y * | 848422.52200 | -0.00001 | 848422.52199 | 1.8 | 3.4 |
| 20 | Z * | 445.32100 | -0.00000 | 445.32100 | 0.4 | 0.8 |
| 4005.00 | | | | | | |
| 22 | X * | 1066439.47100 | 0.00013 | 1066439.47113 | 2.7 | 5.3 |
| 23 | Y * | 848331.19300 | 0.00002 | 848331.19302 | 2.2 | 4.3 |
| 24 | Z * | 455.45000 | -0.00004 | 455.44996 | 0.5 | 0.9 |
| 4006.00 | | | | | | |
| 32 | X * | 1066546.56800 | 0.00012 | 1066546.56812 | 2.9 | 5.7 |
| 33 | Y * | 848288.97100 | 0.00002 | 848288.97102 | 2.3 | 4.6 |
| 34 | Z * | 464.95000 | -0.00001 | 464.94999 | 0.5 | 1.0 |
| 4007.00 | | | | | | |
| 39 | X * | 1066679.18000 | 0.00006 | 1066679.18006 | 3.0 | 5.8 |
| 40 | Y * | 848226.50400 | -0.00004 | 848226.50396 | 2.3 | 4.5 |
| 41 | Z * | 474.14000 | -0.00003 | 474.13997 | 0.5 | 1.0 |
| 4008.00 | | | | | | |
| 46 | X * | 1066805.38100 | 0.00007 | 1066805.38107 | 2.6 | 5.0 |
| 47 | Y * | 848278.64800 | -0.00009 | 848278.64791 | 1.9 | 3.7 |
| 48 | Z * | 473.97900 | -0.00009 | 473.97891 | 0.5 | 0.9 |
| 4009.00 | | | | | | |
| 53 | X * | 1066921.85000 | 0.00003 | 1066921.85003 | 2.1 | 4.1 |
| 54 | Y * | 848308.69800 | -0.00001 | 848308.69799 | 1.2 | 2.3 |
| 55 | Z * | 472.26700 | -0.00002 | 472.26698 | 0.4 | 0.8 |
| 4011.00 | | | | | | |
| 64 | X * | 1067121.64800 | 0.00003 | 1067121.64803 | 2.1 | 4.1 |
| 65 | Y * | 848184.07300 | 0.00006 | 848184.07306 | 2.9 | 5.6 |
| 66 | Z * | 469.52000 | 0.00000 | 469.52000 | 0.6 | 1.2 |
| 5001.00 | | | | | | |
| 8 | X * | 1066197.24100 | -0.00008 | 1066197.24092 | 1.0 | 2.0 |
| 9 | Y * | 848599.00000 | -0.00004 | 848598.99996 | 0.8 | 1.5 |
| 10 | Z * | 431.17000 | 0.00001 | 431.17001 | 0.3 | 0.6 |
| 5002.00 | | | | | | |
| 11 | X * | 1066163.53700 | 0.00010 | 1066163.53710 | 1.7 | 3.3 |
| 12 | Y * | 848515.02600 | -0.00002 | 848515.02598 | 1.6 | 3.1 |
| 13 | Z * | 435.79400 | 0.00000 | 435.79400 | 0.5 | 0.9 |
| 5003.00 | | | | | | |
| 14 | X * | 1066237.57400 | -0.00006 | 1066237.57394 | 1.8 | 3.5 |
| 15 | Y * | 848458.79500 | -0.00005 | 848458.79495 | 1.5 | 2.9 |
| 16 | Z * | 440.92700 | -0.00002 | 440.92698 | 0.4 | 0.7 |
| 5004.00 | | | | | | |
| 25 | X * | 1066348.04600 | 0.00006 | 1066348.04606 | 3.1 | 6.1 |
| 26 | Y * | 848261.25800 | -0.00002 | 848261.25798 | 3.7 | 7.3 |
| 27 | Z * | 459.81800 | 0.00005 | 459.81805 | 0.9 | 1.8 |
| 5005.00 | | | | | | |
| 28 | X * | 1066407.41000 | 0.00009 | 1066407.41009 | 2.9 | 5.7 |
| 29 | Y * | 848287.46600 | 0.00001 | 848287.46601 | 2.6 | 5.1 |
| 30 | Z * | 456.54200 | -0.00001 | 456.54199 | 0.5 | 1.0 |

| | | | | | | | |
|----|---------|---------------|----------|---------------|-----|-----|--|
| | 5006.00 | | | | | | |
| 35 | X * | 1066477.89200 | 0.00015 | 1066477.89215 | 2.8 | 5.6 | |
| 36 | Y * | 848270.25100 | -0.00002 | 848270.25098 | 2.4 | 4.8 | |
| 37 | Z * | 461.95900 | -0.00003 | 461.95897 | 0.5 | 1.0 | |
| | 5007.00 | | | | | | |
| 42 | X * | 1066637.16300 | 0.00007 | 1066637.16307 | 2.8 | 5.5 | |
| 43 | Y * | 848288.20200 | -0.00002 | 848288.20198 | 2.5 | 4.8 | |
| 44 | Z * | 470.04200 | -0.00005 | 470.04195 | 0.5 | 1.1 | |
| | 5008.00 | | | | | | |
| 49 | X * | 1066729.58600 | -0.00000 | 1066729.58600 | 2.7 | 5.2 | |
| 50 | Y * | 848298.18400 | -0.00009 | 848298.18391 | 2.3 | 4.5 | |
| 51 | Z * | 473.26300 | -0.00003 | 473.26297 | 0.5 | 1.0 | |
| | 5009.00 | | | | | | |
| 56 | X * | 1066854.75800 | 0.00013 | 1066854.75813 | 2.3 | 4.5 | |
| 57 | Y * | 848334.30500 | -0.00007 | 848334.30493 | 1.7 | 3.4 | |
| 58 | Z * | 475.58700 | -0.00003 | 475.58697 | 0.5 | 0.9 | |
| | 5010.00 | | | | | | |
| 60 | X * | 1066945.09700 | -0.00001 | 1066945.09699 | 2.7 | 5.3 | |
| 61 | Y * | 848348.77100 | 0.00000 | 848348.77100 | 2.9 | 5.6 | |
| 62 | Z * | 473.40500 | -0.00001 | 473.40499 | 0.5 | 0.9 | |
| | 5011.00 | | | | | | |
| 67 | X * | 1067072.57800 | 0.00000 | 1067072.57800 | 1.3 | 2.5 | |
| 68 | Y * | 848247.88000 | 0.00004 | 848247.88004 | 2.9 | 5.6 | |
| 69 | Z * | 472.21200 | 0.00001 | 472.21201 | 0.2 | 0.5 | |
| | 5012.00 | | | | | | |
| 70 | X * | 1067156.09900 | -0.00003 | 1067156.09897 | 3.2 | 6.3 | |
| 71 | Y * | 848284.29100 | 0.00003 | 848284.29103 | 1.2 | 2.4 | |
| 72 | Z * | 472.60700 | -0.00006 | 472.60694 | 0.5 | 1.0 | |

Adjusted orientation unknowns

| i | standpoint | approximate value [g] | correction [g] | adjusted value [g] | std.dev [cc] | conf.i. |
|----|------------|-----------------------|----------------|--------------------|--------------|---------|
| 4 | 4002.00 | 0.000010 | -0.000006 | 0.000004 | 7.0 | 13.6 |
| 17 | 4003.00 | 0.000008 | -0.000010 | 399.999998 | 5.8 | 11.4 |
| 21 | 4004.00 | 399.999968 | 0.000034 | 0.000002 | 4.9 | 9.6 |
| 31 | 4005.00 | 0.000011 | -0.000006 | 0.000005 | 4.2 | 8.2 |
| 38 | 4006.00 | 0.000021 | -0.000016 | 0.000005 | 3.8 | 7.4 |
| 45 | 4007.00 | 0.000030 | -0.000020 | 0.000009 | 3.8 | 7.4 |
| 52 | 4008.00 | 0.000015 | -0.000004 | 0.000011 | 4.2 | 8.2 |
| 59 | 4009.00 | 399.999981 | 0.000031 | 0.000012 | 5.2 | 10.1 |
| 63 | 4010.00 | 399.999996 | 0.000016 | 0.000013 | 6.4 | 12.6 |

Mean errors and parameters of error ellipses

| point | mp [mm] | mxy [mm] | mean error ellipse | | | conf.err. ellipse | | g |
|---------|---------|----------|--------------------|-----|-----------|-------------------|-----|-----|
| | | | a [mm] | b | alpha [g] | a' [mm] | b' | |
| 4001.00 | 3.2 | 2.3 | 3.1 | 0.8 | 144.3 | 7.7 | 2.0 | 0.0 |
| 4003.00 | 1.7 | 1.2 | 1.3 | 1.1 | 141.7 | 3.2 | 2.6 | 0.0 |
| 4004.00 | 2.7 | 1.9 | 2.1 | 1.7 | 177.4 | 5.1 | 4.2 | 0.0 |
| 4005.00 | 3.5 | 2.4 | 2.7 | 2.2 | 193.0 | 6.6 | 5.3 | 0.0 |
| 4006.00 | 3.7 | 2.6 | 2.9 | 2.3 | 4.8 | 7.1 | 5.7 | 0.0 |

| | | | | | | | | |
|---------|-----|-----|-----|-----|-------|-----|-----|-----|
| 4007.00 | 3.7 | 2.7 | 3.0 | 2.3 | 11.4 | 7.3 | 5.6 | 0.0 |
| 4008.00 | 3.2 | 2.3 | 2.6 | 1.9 | 11.4 | 6.3 | 4.6 | 0.0 |
| 4009.00 | 2.4 | 1.7 | 2.1 | 1.2 | 199.1 | 5.2 | 2.9 | 0.0 |
| 4011.00 | 3.6 | 2.5 | 3.3 | 1.5 | 135.0 | 8.0 | 3.6 | 0.0 |
| 5001.00 | 1.3 | 0.9 | 1.0 | 0.8 | 7.8 | 2.4 | 1.9 | 0.0 |
| 5002.00 | 2.3 | 1.6 | 1.7 | 1.5 | 170.7 | 4.1 | 3.8 | 0.0 |
| 5003.00 | 2.3 | 1.6 | 1.8 | 1.5 | 190.4 | 4.4 | 3.6 | 0.0 |
| 5004.00 | 4.9 | 3.4 | 3.7 | 3.1 | 96.7 | 9.2 | 7.6 | 0.0 |
| 5005.00 | 3.9 | 2.7 | 2.9 | 2.6 | 18.2 | 7.1 | 6.3 | 0.0 |
| 5006.00 | 3.8 | 2.7 | 2.9 | 2.4 | 14.2 | 7.0 | 5.9 | 0.0 |
| 5007.00 | 3.7 | 2.6 | 2.9 | 2.4 | 24.5 | 7.1 | 5.8 | 0.0 |
| 5008.00 | 3.5 | 2.5 | 2.7 | 2.3 | 7.9 | 6.5 | 5.6 | 0.0 |
| 5009.00 | 2.9 | 2.0 | 2.3 | 1.7 | 1.4 | 5.6 | 4.3 | 0.0 |
| 5010.00 | 3.9 | 2.8 | 3.5 | 1.8 | 53.7 | 8.5 | 4.5 | 0.0 |
| 5011.00 | 3.2 | 2.2 | 3.1 | 0.6 | 124.6 | 7.6 | 1.4 | 0.0 |
| 5012.00 | 3.4 | 2.4 | 3.2 | 1.2 | 192.7 | 7.9 | 2.8 | 0.0 |

Maximal mean position error is 4.9 mm on point 5004.00

Average mean position error is 3.2 mm

Adjusted observations

| i | standpoint | target | observed | adjusted | std.dev | conf.i. |
|-------|------------|---------------|------------|------------|---------|------------|
| ===== | ===== | ===== | value | ===== | [m g] | [mm cc] == |
| 1 | 4002.00 | 4001.00 zenit | 105.853800 | 105.853800 | 3.0 | 5.9 |
| 2 | | 4001.00 dir. | 144.329800 | 144.329800 | 3.0 | 5.9 |
| 3 | | 4001.00 slope | 70.12550 | 70.12550 | 3.1 | 6.2 |
| 4 | | 4003.00 zenit | 97.247100 | 97.247080 | 1.6 | 3.0 |
| 5 | | 4003.00 dir. | 312.013700 | 312.013694 | 2.6 | 5.0 |
| 6 | | 4003.00 slope | 112.70030 | 112.70029 | 1.3 | 2.5 |
| 7 | | 5001.00 zenit | 102.587500 | 102.587524 | 2.7 | 5.3 |
| 8 | | 5001.00 dir. | 219.541300 | 219.541301 | 3.0 | 5.8 |
| 9 | | 5001.00 slope | 65.88130 | 65.88135 | 1.0 | 1.9 |
| 10 | | 5002.00 zenit | 99.125600 | 99.125585 | 2.1 | 4.0 |
| 11 | | 5002.00 dir. | 252.353900 | 252.353895 | 2.9 | 5.7 |
| 12 | | 5002.00 slope | 141.75650 | 141.75641 | 1.5 | 3.0 |
| 13 | | 5003.00 zenit | 97.213600 | 97.213619 | 1.4 | 2.7 |
| 14 | | 5003.00 dir. | 291.143400 | 291.143410 | 2.4 | 4.8 |
| 15 | | 5003.00 slope | 161.81180 | 161.81185 | 1.5 | 2.9 |
| 16 | 4003.00 | 4002.00 zenit | 102.752900 | 102.752920 | 1.6 | 3.0 |
| 17 | | 4002.00 dir. | 112.013700 | 112.013700 | 2.9 | 5.7 |
| 18 | | 4002.00 slope | 112.70030 | 112.70029 | 1.3 | 2.5 |
| 19 | | 4004.00 zenit | 96.189900 | 96.189902 | 1.7 | 3.4 |
| 20 | | 4004.00 dir. | 343.199200 | 343.199201 | 3.0 | 5.8 |
| 21 | | 4004.00 slope | 110.37780 | 110.37779 | 1.5 | 3.0 |
| 22 | | 5001.00 zenit | 103.885300 | 103.885256 | 1.8 | 3.5 |
| 23 | | 5001.00 dir. | 147.509200 | 147.509200 | 2.9 | 5.8 |
| 24 | | 5001.00 slope | 123.77030 | 123.77029 | 1.3 | 2.6 |
| 25 | | 5002.00 zenit | 101.580800 | 101.580813 | 2.4 | 4.7 |
| 26 | | 5002.00 dir. | 196.358900 | 196.358904 | 2.9 | 5.8 |
| 27 | | 5002.00 slope | 117.80490 | 117.80477 | 1.4 | 2.7 |
| 28 | | 5003.00 zenit | 97.868500 | 97.868491 | 2.6 | 5.0 |
| 29 | | 5003.00 dir. | 254.072600 | 254.072596 | 2.9 | 5.7 |
| 30 | | 5003.00 slope | 65.95960 | 65.95966 | 1.0 | 2.0 |
| 31 | 4004.00 | 4003.00 zenit | 103.810100 | 103.810098 | 1.7 | 3.4 |
| 32 | | 4003.00 dir. | 143.199200 | 143.199196 | 2.8 | 5.6 |
| 33 | | 4003.00 slope | 110.37780 | 110.37779 | 1.5 | 3.0 |
| 34 | | 4005.00 zenit | 94.959500 | 94.959499 | 1.7 | 3.3 |
| 35 | | 4005.00 dir. | 349.249300 | 349.249301 | 2.9 | 5.6 |
| 36 | | 4005.00 slope | 128.06340 | 128.06339 | 1.7 | 3.3 |
| 37 | | 5003.00 zenit | 102.361700 | 102.361701 | 1.9 | 3.7 |

| | | | | | | | |
|-----|---------|---------|-------|------------|------------|-----|-----|
| 38 | | 5003.00 | dir. | 180.176200 | 180.176202 | 2.9 | 5.6 |
| 39 | | 5003.00 | slope | 118.47220 | 118.47224 | 1.6 | 3.1 |
| 40 | | 5004.00 | zenit | 94.292900 | 94.292900 | 3.0 | 5.9 |
| 41 | | 5004.00 | dir. | 299.121700 | 299.121700 | 3.0 | 5.9 |
| 42 | | 5004.00 | slope | 161.92960 | 161.92960 | 3.3 | 6.5 |
| 43 | | 5005.00 | zenit | 95.138200 | 95.138206 | 1.7 | 3.3 |
| 44 | | 5005.00 | dir. | 325.480100 | 325.480100 | 2.9 | 5.7 |
| 45 | | 5005.00 | slope | 147.07450 | 147.07447 | 1.9 | 3.8 |
| 46 | 4005.00 | 4004.00 | zenit | 105.040500 | 105.040501 | 1.7 | 3.3 |
| 47 | | 4004.00 | dir. | 149.249300 | 149.249298 | 2.9 | 5.8 |
| 48 | | 4004.00 | slope | 128.06340 | 128.06339 | 1.7 | 3.3 |
| 49 | | 4006.00 | zenit | 94.758300 | 94.758278 | 1.6 | 3.1 |
| 50 | | 4006.00 | dir. | 376.092900 | 376.092902 | 2.9 | 5.7 |
| 51 | | 4006.00 | slope | 115.51070 | 115.51066 | 1.8 | 3.5 |
| 52 | | 5005.00 | zenit | 98.718000 | 98.717998 | 2.9 | 5.6 |
| 53 | | 5005.00 | dir. | 259.723100 | 259.723100 | 3.0 | 5.9 |
| 54 | | 5005.00 | slope | 54.23240 | 54.23241 | 1.2 | 2.3 |
| 55 | | 5006.00 | zenit | 94.263700 | 94.263729 | 2.5 | 4.8 |
| 56 | | 5006.00 | dir. | 335.810500 | 335.810500 | 3.0 | 5.8 |
| 57 | | 5006.00 | slope | 72.33580 | 72.33585 | 1.2 | 2.4 |
| 58 | 4006.00 | 4005.00 | zenit | 105.241700 | 105.241722 | 1.6 | 3.1 |
| 59 | | 4005.00 | dir. | 176.092900 | 176.092901 | 2.9 | 5.7 |
| 60 | | 4005.00 | slope | 115.51070 | 115.51066 | 1.8 | 3.5 |
| 61 | | 4007.00 | zenit | 96.014100 | 96.014086 | 1.5 | 2.9 |
| 62 | | 4007.00 | dir. | 371.974600 | 371.974603 | 2.9 | 5.7 |
| 63 | | 4007.00 | slope | 146.87590 | 146.87586 | 1.9 | 3.7 |
| 64 | | 5006.00 | zenit | 102.673500 | 102.673472 | 2.5 | 4.9 |
| 65 | | 5006.00 | dir. | 216.941700 | 216.941697 | 3.0 | 5.8 |
| 66 | | 5006.00 | slope | 71.24450 | 71.24447 | 1.2 | 2.4 |
| 67 | | 5007.00 | zenit | 96.425700 | 96.425720 | 2.4 | 4.7 |
| 68 | | 5007.00 | dir. | 399.459600 | 399.459599 | 3.0 | 5.8 |
| 69 | | 5007.00 | slope | 90.74120 | 90.74119 | 1.3 | 2.6 |
| 70 | 4007.00 | 4006.00 | zenit | 103.985900 | 103.985914 | 1.5 | 2.9 |
| 71 | | 4006.00 | dir. | 171.974600 | 171.974598 | 2.9 | 5.7 |
| 72 | | 4006.00 | slope | 146.87590 | 146.87586 | 1.9 | 3.7 |
| 73 | | 4008.00 | zenit | 100.075100 | 100.075089 | 1.5 | 3.0 |
| 74 | | 4008.00 | dir. | 24.943900 | 24.943903 | 2.9 | 5.7 |
| 75 | | 4008.00 | slope | 136.54930 | 136.54930 | 1.9 | 3.7 |
| 76 | | 5007.00 | zenit | 103.491500 | 103.491484 | 2.6 | 5.1 |
| 77 | | 5007.00 | dir. | 138.061400 | 138.061400 | 3.0 | 5.8 |
| 78 | | 5007.00 | slope | 74.75870 | 74.75873 | 1.2 | 2.4 |
| 79 | | 5008.00 | zenit | 100.637100 | 100.637116 | 2.4 | 4.7 |
| 80 | | 5008.00 | dir. | 60.983100 | 60.983099 | 3.0 | 5.8 |
| 81 | | 5008.00 | slope | 87.63310 | 87.63300 | 1.3 | 2.6 |
| 82 | 4008.00 | 4007.00 | zenit | 99.924900 | 99.924911 | 1.5 | 3.0 |
| 83 | | 4007.00 | dir. | 224.943900 | 224.943901 | 3.0 | 5.8 |
| 84 | | 4007.00 | slope | 136.54930 | 136.54930 | 1.9 | 3.7 |
| 85 | | 4009.00 | zenit | 100.906000 | 100.906008 | 1.6 | 3.1 |
| 86 | | 4009.00 | dir. | 16.074800 | 16.074800 | 3.0 | 5.8 |
| 87 | | 4009.00 | slope | 120.29530 | 120.29529 | 1.9 | 3.6 |
| 88 | | 5008.00 | zenit | 100.582300 | 100.582286 | 2.5 | 5.0 |
| 89 | | 5008.00 | dir. | 183.940800 | 183.940798 | 3.0 | 5.8 |
| 90 | | 5008.00 | slope | 78.27550 | 78.27554 | 1.2 | 2.4 |
| 91 | | 5009.00 | zenit | 98.624300 | 98.624291 | 2.5 | 4.8 |
| 92 | | 5009.00 | dir. | 53.801800 | 53.801800 | 3.0 | 5.8 |
| 93 | | 5009.00 | slope | 74.42030 | 74.42032 | 1.3 | 2.5 |
| 94 | 4009.00 | 4008.00 | zenit | 99.094000 | 99.093992 | 1.6 | 3.1 |
| 95 | | 4008.00 | dir. | 216.074800 | 216.074800 | 3.0 | 5.8 |
| 96 | | 4008.00 | slope | 120.29530 | 120.29529 | 1.9 | 3.6 |
| 97 | | 4010.00 | zenit | 100.379500 | 100.379501 | 1.9 | 3.7 |
| 98 | | 4010.00 | dir. | 393.917500 | 393.917500 | 3.0 | 5.9 |
| 99 | | 4010.00 | slope | 131.68190 | 131.68187 | 2.1 | 4.1 |
| 100 | | 5009.00 | zenit | 97.058900 | 97.058909 | 2.5 | 4.9 |
| 101 | | 5009.00 | dir. | 176.788500 | 176.788500 | 3.0 | 5.8 |

| | | | | | | | |
|-----|---------|---------|-------|------------|------------|-----|-----|
| 102 | | 5009.00 | slope | 71.88930 | 71.88923 | 1.2 | 2.4 |
| 103 | | 5010.00 | zenit | 98.436500 | 98.436500 | 3.0 | 5.9 |
| 104 | | 5010.00 | dir. | 66.534800 | 66.534800 | 3.0 | 5.9 |
| 105 | | 5010.00 | slope | 46.34180 | 46.34180 | 3.1 | 6.1 |
| 106 | 4010.00 | 4009.00 | zenit | 99.620500 | 99.620499 | 1.9 | 3.7 |
| 107 | | 4009.00 | dir. | 193.917500 | 193.917500 | 3.0 | 5.9 |
| 108 | | 4009.00 | slope | 131.68190 | 131.68187 | 2.1 | 4.1 |
| 109 | | 4011.00 | zenit | 100.950100 | 100.950100 | 3.0 | 5.9 |
| 110 | | 4011.00 | dir. | 335.019300 | 335.019300 | 3.0 | 5.9 |
| 111 | | 4011.00 | slope | 131.46960 | 131.46960 | 3.3 | 6.4 |
| 112 | | 5011.00 | zenit | 99.108100 | 99.108100 | 3.0 | 5.9 |
| 113 | | 5011.00 | dir. | 324.617000 | 324.617000 | 3.0 | 5.9 |
| 114 | | 5011.00 | slope | 52.10810 | 52.10810 | 3.1 | 6.1 |
| 115 | | 5012.00 | zenit | 99.310400 | 99.310400 | 3.0 | 5.9 |
| 116 | | 5012.00 | dir. | 392.722800 | 392.722800 | 3.0 | 5.9 |
| 117 | | 5012.00 | slope | 103.85380 | 103.85380 | 3.2 | 6.3 |

Residuals and analysis of observations

| i | standpoint | target | f[%] | v | v' | e-obs. | e-adj. |
|-------|------------|---------|-------|---------|--------|---------|-----------|
| ===== | | | | [mm cc] | ===== | [mm cc] | ===== |
| 1 | 4002.00 | 4001.00 | zenit | 0.0 u | 0.000 | | |
| 2 | | 4001.00 | dir. | 0.0 u | 0.000 | | |
| 3 | | 4001.00 | slope | 0.0 u | 0.000 | | |
| 4 | | 4003.00 | zenit | 48.2 | -0.197 | 0.1 | -0.3 -0.1 |
| 5 | | 4003.00 | dir. | 14.7 | -0.064 | 0.0 | -0.2 -0.2 |
| 6 | | 4003.00 | slope | 60.5 | -0.009 | 0.0 | -0.0 -0.0 |
| 7 | | 5001.00 | zenit | 9.6 | 0.236 | 0.2 | 1.3 1.1 |
| 8 | | 5001.00 | dir. | 0.5 w | 0.013 | 0.0 | |
| 9 | | 5001.00 | slope | 68.3 | 0.049 | 0.0 | 0.1 0.0 |
| 10 | | 5002.00 | zenit | 31.5 | -0.151 | 0.1 | -0.3 -0.1 |
| 11 | | 5002.00 | dir. | 3.3 w | -0.052 | 0.1 | |
| 12 | | 5002.00 | slope | 52.9 | -0.085 | 0.0 | -0.1 -0.0 |
| 13 | | 5003.00 | zenit | 53.6 | 0.193 | 0.1 | 0.2 0.1 |
| 14 | | 5003.00 | dir. | 18.4 | 0.103 | 0.1 | 0.3 0.2 |
| 15 | | 5003.00 | slope | 56.2 | 0.051 | 0.0 | 0.1 0.0 |
| 16 | 4003.00 | 4002.00 | zenit | 48.2 | 0.197 | 0.1 | 0.3 0.1 |
| 17 | | 4002.00 | dir. | 3.5 w | -0.005 | 0.0 | |
| 18 | | 4002.00 | slope | 60.5 | -0.009 | 0.0 | -0.0 -0.0 |
| 19 | | 4004.00 | zenit | 41.9 | 0.019 | 0.0 | 0.0 0.0 |
| 20 | | 4004.00 | dir. | 0.9 w | 0.009 | 0.0 | |
| 21 | | 4004.00 | slope | 52.6 | -0.006 | 0.0 | -0.0 -0.0 |
| 22 | | 5001.00 | zenit | 40.3 | -0.443 | 0.2 m | -0.7 -0.2 |
| 23 | | 5001.00 | dir. | 2.1 w | -0.002 | 0.0 | |
| 24 | | 5001.00 | slope | 59.6 | -0.005 | 0.0 | -0.0 -0.0 |
| 25 | | 5002.00 | zenit | 20.4 | 0.126 | 0.1 | 0.3 0.2 |
| 26 | | 5002.00 | dir. | 2.2 w | 0.039 | 0.1 | |
| 27 | | 5002.00 | slope | 57.6 | -0.131 | 0.0 | -0.2 -0.0 |
| 28 | | 5003.00 | zenit | 14.3 | -0.086 | 0.1 | -0.3 -0.2 |
| 29 | | 5003.00 | dir. | 2.9 w | -0.042 | 0.1 | |
| 30 | | 5003.00 | slope | 68.0 | 0.058 | 0.0 | 0.1 0.0 |
| 31 | 4004.00 | 4003.00 | zenit | 41.9 | -0.019 | 0.0 | -0.0 -0.0 |
| 32 | | 4003.00 | dir. | 5.4 | -0.036 | 0.0 | -0.3 -0.3 |
| 33 | | 4003.00 | slope | 52.6 | -0.006 | 0.0 | -0.0 -0.0 |
| 34 | | 4005.00 | zenit | 43.1 | -0.015 | 0.0 | -0.0 -0.0 |
| 35 | | 4005.00 | dir. | 4.1 w | 0.011 | 0.0 | |
| 36 | | 4005.00 | slope | 48.5 | -0.015 | 0.0 | -0.0 -0.0 |
| 37 | | 5003.00 | zenit | 37.4 | 0.015 | 0.0 | 0.0 0.0 |
| 38 | | 5003.00 | dir. | 4.0 w | 0.025 | 0.0 | |
| 39 | | 5003.00 | slope | 51.6 | 0.044 | 0.0 | 0.1 0.0 |
| 40 | | 5004.00 | zenit | 0.0 u | 0.000 | | |

| | | | | | | | | | |
|-----|---------|---------|-------|------|---|--------|-----|------|------|
| 41 | | 5004.00 | dir. | 0.0 | u | -0.000 | | | |
| 42 | | 5004.00 | slope | 0.0 | u | -0.000 | | | |
| 43 | | 5005.00 | zenit | 44.3 | | 0.064 | 0.0 | 0.1 | 0.0 |
| 44 | | 5005.00 | dir. | 2.9 | w | 0.000 | 0.0 | | |
| 45 | | 5005.00 | slope | 40.9 | | -0.035 | 0.0 | -0.1 | -0.0 |
| 46 | 4005.00 | 4004.00 | zenit | 43.1 | | 0.015 | 0.0 | 0.0 | 0.0 |
| 47 | | 4004.00 | dir. | 2.1 | w | -0.015 | 0.0 | | |
| 48 | | 4004.00 | slope | 48.5 | | -0.015 | 0.0 | -0.0 | -0.0 |
| 49 | | 4006.00 | zenit | 47.4 | | -0.219 | 0.1 | -0.3 | -0.1 |
| 50 | | 4006.00 | dir. | 2.3 | w | 0.015 | 0.0 | | |
| 51 | | 4006.00 | slope | 44.7 | | -0.039 | 0.0 | -0.1 | -0.0 |
| 52 | | 5005.00 | zenit | 4.8 | w | -0.024 | 0.0 | | |
| 53 | | 5005.00 | dir. | 0.3 | w | 0.001 | 0.0 | | |
| 54 | | 5005.00 | slope | 61.6 | | 0.011 | 0.0 | 0.0 | 0.0 |
| 55 | | 5006.00 | zenit | 17.9 | | 0.289 | 0.2 | 0.9 | 0.6 |
| 56 | | 5006.00 | dir. | 0.6 | w | -0.000 | 0.0 | | |
| 57 | | 5006.00 | slope | 60.8 | | 0.048 | 0.0 | 0.1 | 0.0 |
| 58 | 4006.00 | 4005.00 | zenit | 47.4 | | 0.219 | 0.1 | 0.3 | 0.1 |
| 59 | | 4005.00 | dir. | 2.4 | w | 0.015 | 0.0 | | |
| 60 | | 4005.00 | slope | 44.7 | | -0.039 | 0.0 | -0.1 | -0.0 |
| 61 | | 4007.00 | zenit | 50.7 | | -0.144 | 0.1 | -0.2 | -0.0 |
| 62 | | 4007.00 | dir. | 3.0 | w | 0.026 | 0.0 | | |
| 63 | | 4007.00 | slope | 43.2 | | -0.041 | 0.0 | -0.1 | -0.0 |
| 64 | | 5006.00 | zenit | 17.2 | | -0.284 | 0.2 | -0.9 | -0.6 |
| 65 | | 5006.00 | dir. | 0.7 | w | -0.029 | 0.1 | | |
| 66 | | 5006.00 | slope | 61.2 | | -0.032 | 0.0 | -0.0 | -0.0 |
| 67 | | 5007.00 | zenit | 20.6 | | 0.196 | 0.1 | 0.5 | 0.3 |
| 68 | | 5007.00 | dir. | 1.6 | w | -0.011 | 0.0 | | |
| 69 | | 5007.00 | slope | 58.1 | | -0.005 | 0.0 | -0.0 | -0.0 |
| 70 | 4007.00 | 4006.00 | zenit | 50.7 | | 0.144 | 0.1 | 0.2 | 0.0 |
| 71 | | 4006.00 | dir. | 2.5 | w | -0.017 | 0.0 | | |
| 72 | | 4006.00 | slope | 43.2 | | -0.041 | 0.0 | -0.1 | -0.0 |
| 73 | | 4008.00 | zenit | 48.9 | | -0.110 | 0.0 | -0.1 | -0.0 |
| 74 | | 4008.00 | dir. | 2.4 | w | 0.028 | 0.0 | | |
| 75 | | 4008.00 | slope | 41.9 | | 0.000 | 0.0 | 0.0 | 0.0 |
| 76 | | 5007.00 | zenit | 13.4 | | -0.162 | 0.1 | -0.6 | -0.5 |
| 77 | | 5007.00 | dir. | 1.1 | w | 0.002 | 0.0 | | |
| 78 | | 5007.00 | slope | 61.6 | | 0.034 | 0.0 | 0.0 | 0.0 |
| 79 | | 5008.00 | zenit | 20.0 | | 0.159 | 0.1 | 0.4 | 0.3 |
| 80 | | 5008.00 | dir. | 1.0 | w | -0.012 | 0.0 | | |
| 81 | | 5008.00 | slope | 58.0 | | -0.098 | 0.0 | -0.1 | -0.0 |
| 82 | 4008.00 | 4007.00 | zenit | 48.9 | | 0.110 | 0.0 | 0.1 | 0.0 |
| 83 | | 4007.00 | dir. | 1.2 | w | 0.007 | 0.0 | | |
| 84 | | 4007.00 | slope | 41.9 | | 0.000 | 0.0 | 0.0 | 0.0 |
| 85 | | 4009.00 | zenit | 48.0 | | 0.085 | 0.0 | 0.1 | 0.0 |
| 86 | | 4009.00 | dir. | 1.2 | w | 0.005 | 0.0 | | |
| 87 | | 4009.00 | slope | 42.6 | | -0.007 | 0.0 | -0.0 | -0.0 |
| 88 | | 5008.00 | zenit | 15.6 | | -0.142 | 0.1 | -0.5 | -0.4 |
| 89 | | 5008.00 | dir. | 0.8 | w | -0.015 | 0.0 | | |
| 90 | | 5008.00 | slope | 61.0 | | 0.043 | 0.0 | 0.1 | 0.0 |
| 91 | | 5009.00 | zenit | 18.0 | | -0.089 | 0.1 | -0.3 | -0.2 |
| 92 | | 5009.00 | dir. | 0.8 | w | 0.004 | 0.0 | | |
| 93 | | 5009.00 | slope | 60.1 | | 0.023 | 0.0 | 0.0 | 0.0 |
| 94 | 4009.00 | 4008.00 | zenit | 48.0 | | -0.085 | 0.0 | -0.1 | -0.0 |
| 95 | | 4008.00 | dir. | 0.7 | w | -0.004 | 0.0 | | |
| 96 | | 4008.00 | slope | 42.6 | | -0.007 | 0.0 | -0.0 | -0.0 |
| 97 | | 4010.00 | zenit | 36.5 | | 0.014 | 0.0 | 0.0 | 0.0 |
| 98 | | 4010.00 | dir. | 0.1 | u | 0.003 | | | |
| 99 | | 4010.00 | slope | 35.5 | | -0.026 | 0.0 | -0.0 | -0.0 |
| 100 | | 5009.00 | zenit | 16.7 | | 0.086 | 0.1 | 0.3 | 0.2 |
| 101 | | 5009.00 | dir. | 0.7 | w | 0.002 | 0.0 | | |
| 102 | | 5009.00 | slope | 61.2 | | -0.068 | 0.0 | -0.1 | -0.0 |
| 103 | | 5010.00 | zenit | 0.0 | u | 0.000 | | | |
| 104 | | 5010.00 | dir. | 0.0 | u | 0.000 | | | |

| | | | | | | | | | |
|-----|---------|---------|-------|------|---|--------|-----|------|------|
| 105 | | 5010.00 | slope | 0.0 | u | 0.000 | | | |
| 106 | 4010.00 | 4009.00 | zenit | 36.5 | | -0.014 | 0.0 | -0.0 | -0.0 |
| 107 | | 4009.00 | dir. | 0.0 | u | 0.000 | | | |
| 108 | | 4009.00 | slope | 35.5 | | -0.026 | 0.0 | -0.0 | -0.0 |
| 109 | | 4011.00 | zenit | 0.0 | u | 0.000 | | | |
| 110 | | 4011.00 | dir. | 0.0 | u | -0.000 | | | |
| 111 | | 4011.00 | slope | 0.0 | u | 0.000 | | | |
| 112 | | 5011.00 | zenit | 0.0 | u | -0.000 | | | |
| 113 | | 5011.00 | dir. | 0.0 | u | -0.000 | | | |
| 114 | | 5011.00 | slope | 0.0 | u | 0.000 | | | |
| 115 | | 5012.00 | zenit | 0.0 | u | 0.000 | | | |
| 116 | | 5012.00 | dir. | 0.0 | u | 0.000 | | | |
| 117 | | 5012.00 | slope | 0.0 | u | 0.000 | | | |

Test of normality of homogenised residuals

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Test Kolmogorov-Smirnov : 0.0 %

Condition number : 1.0e+002