fiducials\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8877 | -9045 | -8877 | -9045 | -8877 | -9044 | -8877 | -9045 |
| 8937 | 8770 | 8951 | 8756 | 8936 | 8771 | 8938 | 8770 |
| -8879 | 8769 | -8866 | 8767 | -8879 | 8769 | -8878 | 8768 |
| 8939 | -9043 | 8939 | -9043 | 8943 | -9042 | 8939 | -9043 |
| -9381 | -139 | -9375 | -138 | -9382 | -138 | -9381 | -139 |
| 9442 | -136 | 9448 | -151 | 9442 | -137 | 9442 | -137 |
| 30 | 9274 | 43 | 9267 | 29 | 9274 | 30 | 9273 |
| 30 | -9549 | 31 | -9549 | 31 | -9549 | 31 | -9549 |

control\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -777 | 7945 | -766 | 7947 | -776 | 7946 | -777 | 7944 |
| -171 | -643 | -168 | -643 | -176 | -640 | -172 | -643 |
| 1619 | -7015 | 1627 | -7019 | 1624 | -7005 | 1620 | -7011 |
| 7620 | -7788 | 7628 | -7793 | 7638 | -7799 | 7617 | -7787 |
| 1558 | 9068 | 1557 | 9068 | 1557 | 9068 | 1557 | 9066 |
| 3776 | 488 | 3784 | 491 | 3783 | 492 | 3774 | 486 |
| -612 | -4266 | -613 | -4267 | -612 | -4262 | -614 | -4265 |
| 4460 | -7967 | 4452 | -7971 | 4461 | -7965 | 4461 | -7965 |

tie\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -818 | 1123 | -819 | 1122 | -817 | 1123 | -818 | 1123 |
| 7961 | -483 | 7962 | -482 | 7963 | -482 | 7961 | -483 |
| -874 | -8935 | -874 | -8936 | -874 | -8937 | -874 | -8936 |
| 7600 | -7815 | 7600 | -7816 | 7601 | -7816 | 7600 | -7816 |
| -765 | 7949 | -766 | 7949 | -766 | 7949 | -765 | 7949 |
| 7210 | 8547 | 7211 | 8546 | 7211 | 8545 | 7210 | 8546 |

mean\_\_std\_fiducials\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -8877.0 | -9044.75 | 0.0 | 0.5 |
| 8940.5 | 8766.75 | 7.05 | 7.18 |
| -8875.5 | 8768.25 | 6.35 | 0.96 |
| 8940.0 | -9042.75 | 2.0 | 0.5 |
| -9379.75 | -138.5 | 3.2 | 0.58 |
| 9443.5 | -140.25 | 3.0 | 7.18 |
| 33.0 | 9272.0 | 6.68 | 3.37 |
| 30.75 | -9549.0 | 0.5 | 0.0 |

mean\_\_std\_control\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -774.0 | 7945.5 | 5.35 | 1.29 |
| -171.75 | -642.25 | 3.3 | 1.5 |
| 1622.5 | -7012.5 | 3.7 | 5.97 |
| 7625.75 | -7791.75 | 9.39 | 5.5 |
| 1557.25 | 9067.5 | 0.5 | 1.0 |
| 3779.25 | 489.25 | 4.99 | 2.75 |
| -612.75 | -4265.0 | 0.96 | 2.16 |
| 4458.5 | -7967.0 | 4.36 | 2.83 |

mean\_\_std\_tie\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -818.0 | 1122.75 | 0.82 | 0.5 |
| 7961.75 | -482.5 | 0.96 | 0.58 |
| -874.0 | -8936.0 | 0.0 | 0.82 |
| 7600.25 | -7815.75 | 0.5 | 0.5 |
| -765.5 | 7949.0 | 0.58 | 0.0 |
| 7210.5 | 8546.0 | 0.58 | 0.82 |

fiducials\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8884 | -9038 | -8884 | -9039 | -8883 | -9039 | -8884 | -9038 |
| 8944 | 8764 | 8944 | 8763 | 8944 | 8766 | 8944 | 8764 |
| -8873 | 8775 | -8873 | 8775 | -8873 | 8775 | -8873 | 8775 |
| 8931 | -9050 | 8931 | -9050 | 8930 | -9049 | 8932 | -9050 |
| -9382 | -132 | -9382 | -131 | -9383 | -132 | -9382 | -132 |
| 9441 | -144 | 9441 | -144 | 9441 | -143 | 9441 | -144 |
| 36 | 9275 | 37 | 9274 | 37 | 9273 | 37 | 9274 |
| 23 | -9548 | 23 | -9549 | 23 | -9549 | 24 | -9548 |

control\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8827 | 8164 | -8823 | 8167 | -8829 | 8166 | -8833 | 8163 |
| -7962 | -540 | -7959 | -540 | -7961 | -540 | -7963 | -539 |
| -6073 | -6839 | -6071 | -6833 | -6072 | -6836 | -6072 | -6836 |
| -91 | -7442 | -84 | -7449 | -91 | -7442 | -95 | -7441 |
| -6504 | 9396 | -6505 | 9398 | -6504 | 9395 | -6504 | 9395 |
| -4077 | 716 | -4068 | 720 | -4078 | 715 | -4079 | 715 |
| -8283 | -4173 | -8273 | -4168 | -8284 | -4172 | -8283 | -4172 |
| -3249 | -7705 | -3249 | -7708 | -3248 | -7703 | -3247 | -7702 |

tie\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8694 | 1218 | -8695 | 1213 | -8696 | 1215 | -8695 | 1218 |
| 101 | -140 | 103 | -137 | 102 | -140 | 101 | -140 |
| -8395 | -8799 | -8393 | -8799 | -8395 | -8799 | -8395 | -8799 |
| -111 | -7469 | -113 | -7467 | -110 | -7470 | -111 | -7470 |
| -8821 | 8167 | -8823 | 8152 | -8822 | 8165 | -8821 | 8166 |
| -783 | 9048 | -786 | 9047 | -781 | 9048 | -782 | 9048 |

mean\_\_std\_fiducials\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8883.75 | -9038.5 | 0.5 | 0.58 |
| 8944.0 | 8764.25 | 0.0 | 1.26 |
| -8873.0 | 8775.0 | 0.0 | 0.0 |
| 8931.0 | -9049.75 | 0.82 | 0.5 |
| -9382.25 | -131.75 | 0.5 | 0.5 |
| 9441.0 | -143.75 | 0.0 | 0.5 |
| 36.75 | 9274.0 | 0.5 | 0.82 |
| 23.25 | -9548.5 | 0.5 | 0.58 |

mean\_\_std\_control\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8828.0 | 8165.0 | 4.16 | 1.83 |
| -7961.25 | -539.75 | 1.71 | 0.5 |
| -6072.0 | -6836.0 | 0.82 | 2.45 |
| -90.25 | -7443.5 | 4.57 | 3.7 |
| -6504.25 | 9396.0 | 0.5 | 1.41 |
| -4075.5 | 716.5 | 5.07 | 2.38 |
| -8280.75 | -4171.25 | 5.19 | 2.22 |
| -3248.25 | -7704.5 | 0.96 | 2.65 |

mean\_\_std\_tie\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8695.0 | 1216.0 | 0.82 | 2.45 |
| 101.75 | -139.25 | 0.96 | 1.5 |
| -8394.5 | -8799.0 | 1.0 | 0.0 |
| -111.25 | -7469.0 | 1.26 | 1.41 |
| -8821.75 | 8162.5 | 0.96 | 7.05 |
| -783.0 | 9047.75 | 2.16 | 0.5 |

residual\_image\_27

|  |  |
| --- | --- |
| -0.004161 | -0.007042 |
| 0.0007 | -0.004617 |
| -0.002541 | 0.007406 |
| 0.005976 | 0.021594 |
| 0.006588 | -0.00293 |
| -0.006074 | -0.018656 |
| 0.001485 | 0.007684 |
| -0.001972 | -0.00344 |

residual\_image\_28

|  |  |
| --- | --- |
| 0.004864 | 0.002514 |
| 0.008032 | 0.002944 |
| -0.011877 | -0.002244 |
| -0.006998 | 0.000734 |
| 0.001838 | -0.003601 |
| -0.005782 | -0.006828 |
| 0.005771 | 0.004446 |
| 0.004152 | 0.002035 |

residual\_test

|  |  |
| --- | --- |
| -0.007366 | -0.004732 |
| -0.006623 | -0.002921 |
| 0.015168 | -0.009748 |
| 0.012766 | 0.005017 |
| -0.001198 | 0.003946 |
| -0.003939 | 0.002113 |
| -0.003568 | -0.006794 |
| -0.010601 | 0.014421 |
| 0.004003 | 0.002442 |
| 0.001827 | -0.002776 |
| 0.001524 | 0.000136 |
| -0.009814 | 0.009802 |
| -0.009597 | -0.008094 |
| 0.001605 | -0.00577 |
| 0.003748 | 0.00533 |
| 0.012066 | -0.002372 |

radial\_lens

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 149.9089 | -0.0117 | -0.0083 | -0.0083 | 149.8958 | -0.0117 | -0.0083 | -0.0083 |
| 149.9124 | -0.0117 | 0.0083 | 0.0083 | 149.9229 | -0.0117 | 0.0083 | 0.0083 |
| 149.9116 | -0.0117 | -0.0083 | 0.0083 | 149.9113 | -0.0117 | -0.0083 | 0.0083 |
| 149.909 | -0.0117 | 0.0083 | -0.0083 | 149.9146 | -0.0117 | 0.0083 | -0.0083 |
| 111.9874 | -0.0122 | -0.0122 | -0.0 | 111.9922 | -0.0122 | -0.0122 | -0.0 |
| 112.0059 | -0.0122 | 0.0122 | -0.0 | 112.0062 | -0.0122 | 0.0122 | -0.0 |
| 112.0087 | -0.0122 | 0.0 | 0.0122 | 112.0054 | -0.0122 | 0.0 | 0.0122 |
| 112.0074 | -0.0122 | 0.0 | -0.0122 | 112.002 | -0.0122 | 0.0 | -0.0122 |
| 96.6965 | -0.0094 | -0.0009 | 0.0093 | 144.4742 | -0.013 | -0.0095 | 0.0089 |
| 6.4628 | -0.0 | -0.0 | -0.0 | 95.2023 | -0.0091 | -0.0091 | -0.0005 |
| 83.9812 | -0.0069 | 0.0015 | -0.0067 | 107.8204 | -0.0115 | -0.0077 | -0.0085 |
| 128.3218 | -0.014 | 0.0099 | -0.0099 | 86.9617 | -0.0074 | -0.0001 | -0.0074 |
| 111.0682 | -0.0121 | 0.002 | 0.0119 | 137.5425 | -0.0139 | -0.0079 | 0.0114 |
| 45.2235 | -0.0013 | 0.0013 | 0.0002 | 49.8881 | -0.0017 | -0.0017 | 0.0004 |
| 49.7083 | -0.0017 | -0.0003 | -0.0017 | 109.9184 | -0.0119 | -0.0107 | -0.0052 |
| 107.0444 | -0.0114 | 0.0056 | -0.0099 | 98.1347 | -0.0097 | -0.0038 | -0.0089 |
| 18.0967 | -0.0001 | -0.0 | 0.0001 | 105.057 | -0.011 | -0.0109 | 0.0017 |
| 94.4624 | -0.0089 | 0.0089 | -0.0004 | 0.8686 | -0.0 | 0.0 | -0.0 |
| 105.263 | -0.011 | -0.0011 | -0.011 | 143.7777 | -0.0131 | -0.0091 | -0.0094 |
| 128.3116 | -0.014 | 0.0098 | -0.01 | 87.2695 | -0.0075 | -0.0001 | -0.0075 |
| 96.728 | -0.0094 | -0.0009 | 0.0093 | 144.3996 | -0.013 | -0.0095 | 0.0089 |
| 134.099 | -0.0141 | 0.009 | 0.0108 | 109.7395 | -0.0118 | -0.001 | 0.0118 |

decentering\_lens

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 149.9089 | -0.0058 | 0.0025 | 149.8958 | -0.0058 | 0.0025 |
| 149.9124 | -0.0058 | 0.0025 | 149.9229 | -0.0058 | 0.0025 |
| 149.9116 | -0.0063 | -0.0036 | 149.9113 | -0.0063 | -0.0036 |
| 149.909 | -0.0063 | -0.0036 | 149.9146 | -0.0063 | -0.0036 |
| 111.9874 | -0.0051 | -0.0002 | 111.9922 | -0.0051 | -0.0002 |
| 112.0059 | -0.0051 | -0.0002 | 112.0062 | -0.0051 | -0.0002 |
| 112.0087 | -0.0017 | -0.0005 | 112.0054 | -0.0017 | -0.0005 |
| 112.0074 | -0.0017 | -0.0005 | 112.002 | -0.0017 | -0.0005 |
| 96.6965 | -0.0013 | -0.0006 | 144.4742 | -0.0061 | -0.0033 |
| 6.4628 | -0.0 | 0.0 | 95.2023 | -0.0036 | 0.0 |
| 83.9812 | -0.0011 | -0.0007 | 107.8204 | -0.0028 | 0.0013 |
| 128.3218 | -0.0046 | -0.0026 | 86.9617 | -0.001 | -0.0002 |
| 111.0682 | -0.0017 | 0.0001 | 137.5425 | -0.0044 | -0.0029 |
| 45.2235 | -0.0008 | 0.0001 | 49.8881 | -0.001 | -0.0002 |
| 49.7083 | -0.0003 | 0.0 | 109.9184 | -0.0041 | 0.0011 |
| 107.0444 | -0.0024 | -0.0017 | 98.1347 | -0.0016 | 0.0006 |
| 18.0967 | -0.0001 | -0.0001 | 105.057 | -0.0044 | -0.0006 |
| 94.4624 | -0.0036 | -0.0002 | 0.8686 | -0.0 | -0.0 |
| 105.263 | -0.0015 | -0.0001 | 143.7777 | -0.0052 | 0.0023 |
| 128.3116 | -0.0046 | -0.0026 | 87.2695 | -0.001 | -0.0002 |
| 96.728 | -0.0013 | -0.0006 | 144.3996 | -0.0061 | -0.0033 |
| 134.099 | -0.0042 | 0.0019 | 109.7395 | -0.0017 | -0.0007 |

atmospheric\_refraction

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 96.6965 | 0.0016 | 0.0002 | -0.0016 | 144.4742 | 0.0033 | 0.0024 | -0.0022 |
| 6.4628 | 0.0001 | 0.0 | 0.0001 | 95.2023 | 0.0016 | 0.0016 | 0.0001 |
| 83.9812 | 0.0013 | -0.0003 | 0.0013 | 107.8204 | 0.0019 | 0.0013 | 0.0014 |
| 128.3218 | 0.0026 | -0.0018 | 0.0019 | 86.9617 | 0.0014 | 0.0 | 0.0014 |
| 111.0682 | 0.002 | -0.0003 | -0.002 | 137.5425 | 0.003 | 0.0017 | -0.0024 |
| 45.2235 | 0.0006 | -0.0006 | -0.0001 | 49.8881 | 0.0007 | 0.0006 | -0.0001 |
| 49.7083 | 0.0007 | 0.0001 | 0.0006 | 109.9184 | 0.002 | 0.0018 | 0.0009 |
| 107.0444 | 0.0019 | -0.0009 | 0.0017 | 98.1347 | 0.0017 | 0.0007 | 0.0015 |
| 18.0967 | 0.0002 | 0.0001 | -0.0002 | 105.057 | 0.0018 | 0.0018 | -0.0003 |
| 94.4624 | 0.0016 | -0.0016 | 0.0001 | 0.8686 | 0.0 | -0.0 | 0.0 |
| 105.263 | 0.0019 | 0.0002 | 0.0018 | 143.7777 | 0.0032 | 0.0023 | 0.0023 |
| 128.3116 | 0.0026 | -0.0018 | 0.0019 | 87.2695 | 0.0014 | 0.0 | 0.0014 |
| 96.728 | 0.0016 | 0.0002 | -0.0016 | 144.3996 | 0.0033 | 0.0024 | -0.0022 |
| 134.099 | 0.0028 | -0.0018 | -0.0022 | 109.7395 | 0.002 | 0.0002 | -0.002 |

measurements

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -106.001 | -106.002 | -105.992 | -105.992 | -105.995 | -106.008 | -105.986 | -105.998 | -106.003 | -106.016 | -105.994 | -106.007 | -106.009 | -106.014 | -106.0 | -106.004 | -106.009 | -106.014 | -106.0 | -106.004 |
| 106.005 | 106.003 | 106.012 | 106.011 | 106.011 | 105.997 | 106.018 | 106.005 | 106.019 | 106.006 | 106.026 | 106.013 | 106.013 | 106.008 | 106.021 | 106.016 | 106.013 | 106.008 | 106.021 | 106.016 |
| -106.003 | 106.016 | -106.012 | 106.007 | -105.997 | 106.01 | -106.006 | 106.001 | -106.005 | 106.019 | -106.014 | 106.009 | -106.011 | 106.015 | -106.02 | 106.005 | -106.011 | 106.015 | -106.02 | 106.005 |
| 106.018 | -105.973 | 106.005 | -105.994 | 106.024 | -105.979 | 106.011 | -106.0 | 106.032 | -105.988 | 106.019 | -106.009 | 106.026 | -105.991 | 106.013 | -106.012 | 106.026 | -105.991 | 106.013 | -106.012 |
| -111.993 | 0.004 | -111.998 | 0.003 | -111.987 | -0.002 | -111.992 | -0.003 | -112.0 | -0.002 | -112.004 | -0.003 | -112.005 | -0.002 | -112.009 | -0.003 | -112.005 | -0.002 | -112.009 | -0.003 |
| 112.0 | -0.012 | 112.0 | 0.0 | 112.006 | -0.018 | 112.006 | -0.006 | 112.018 | -0.018 | 112.018 | -0.006 | 112.013 | -0.018 | 112.013 | -0.006 | 112.013 | -0.018 | 112.013 | -0.006 |
| 0.006 | 112.015 | 0.011 | 112.011 | 0.012 | 112.009 | 0.017 | 112.005 | 0.012 | 112.021 | 0.017 | 112.018 | 0.011 | 112.02 | 0.015 | 112.017 | 0.011 | 112.02 | 0.015 | 112.017 |
| 0.0 | -112.001 | 0.006 | -111.996 | 0.006 | -112.007 | 0.012 | -112.002 | 0.006 | -112.02 | 0.012 | -112.014 | 0.004 | -112.02 | 0.01 | -112.015 | 0.004 | -112.02 | 0.01 | -112.015 |
| -9.595 | 96.226 | -105.471 | 98.747 | -9.589 | 96.22 | -105.465 | 98.741 | -9.59 | 96.229 | -105.475 | 98.75 | -9.591 | 96.229 | -105.481 | 98.747 | -9.591 | 96.227 | -105.478 | 98.745 |
| -2.419 | -5.989 | -95.085 | -4.842 | -2.413 | -5.995 | -95.079 | -4.848 | -2.413 | -5.995 | -95.088 | -4.848 | -2.413 | -5.995 | -95.091 | -4.848 | -2.413 | -5.995 | -95.09 | -4.848 |
| 18.939 | -81.81 | -72.55 | -79.76 | 18.945 | -81.816 | -72.544 | -79.766 | 18.946 | -81.823 | -72.552 | -79.774 | 18.945 | -81.824 | -72.555 | -79.773 | 18.945 | -81.823 | -72.554 | -79.771 |
| 90.377 | -91.084 | -1.362 | -86.945 | 90.383 | -91.09 | -1.356 | -86.951 | 90.393 | -91.1 | -1.356 | -86.959 | 90.389 | -91.102 | -1.357 | -86.959 | 90.387 | -91.1 | -1.357 | -86.957 |
| 18.145 | 109.581 | -77.829 | 113.415 | 18.151 | 109.575 | -77.823 | 113.409 | 18.153 | 109.587 | -77.831 | 113.42 | 18.151 | 109.587 | -77.835 | 113.417 | 18.151 | 109.585 | -77.833 | 113.415 |
| 44.596 | 7.479 | -48.854 | 10.138 | 44.602 | 7.473 | -48.848 | 10.132 | 44.603 | 7.474 | -48.85 | 10.132 | 44.602 | 7.474 | -48.851 | 10.132 | 44.602 | 7.474 | -48.85 | 10.132 |
| -7.663 | -49.109 | -98.857 | -48.063 | -7.657 | -49.115 | -98.851 | -48.069 | -7.657 | -49.117 | -98.861 | -48.074 | -7.658 | -49.117 | -98.866 | -48.073 | -7.658 | -49.116 | -98.864 | -48.072 |
| 52.688 | -93.171 | -38.94 | -90.075 | 52.694 | -93.177 | -38.934 | -90.081 | 52.699 | -93.186 | -38.938 | -90.09 | 52.697 | -93.188 | -38.94 | -90.089 | 52.696 | -93.186 | -38.939 | -90.087 |
| -10.111 | 15.018 | -103.831 | 16.048 | -10.105 | 15.012 | -103.825 | 16.042 | -10.106 | 15.012 | -103.836 | 16.044 | -10.106 | 15.012 | -103.84 | 16.043 | -10.105 | 15.012 | -103.838 | 16.043 |
| 94.368 | -4.086 | 0.862 | -0.016 | 94.374 | -4.092 | 0.868 | -0.022 | 94.383 | -4.092 | 0.868 | -0.022 | 94.379 | -4.092 | 0.868 | -0.022 | 94.377 | -4.092 | 0.868 | -0.022 |
| -10.767 | -104.705 | -100.172 | -103.139 | -10.761 | -104.711 | -100.166 | -103.145 | -10.762 | -104.722 | -100.175 | -103.154 | -10.764 | -104.723 | -100.18 | -103.152 | -10.763 | -104.721 | -100.178 | -103.149 |
| 90.074 | -91.369 | -1.612 | -87.249 | 90.08 | -91.375 | -1.606 | -87.255 | 90.09 | -91.385 | -1.606 | -87.262 | 90.085 | -91.388 | -1.607 | -87.262 | 90.083 | -91.386 | -1.607 | -87.261 |
| -9.494 | 96.268 | -105.397 | 98.718 | -9.488 | 96.262 | -105.391 | 98.712 | -9.489 | 96.271 | -105.4 | 98.721 | -9.49 | 96.27 | -105.406 | 98.717 | -9.49 | 96.269 | -105.404 | 98.715 |
| 85.418 | 103.375 | -9.742 | 109.313 | 85.424 | 103.369 | -9.736 | 109.307 | 85.433 | 103.38 | -9.737 | 109.319 | 85.429 | 103.382 | -9.739 | 109.318 | 85.427 | 103.38 | -9.739 | 109.316 |