**Lab #4**

Tasks 1:

Initial Conditions:

|  |  |
| --- | --- |
| tX (m) | 79.9824 |
| tY (m) | -631.0415 |
| tZ (m) | 1854.9756 |
| omega (dd) | 0.0 |
| phi (dd) | 0.0 |
| kappa (dd) | -90.1948 |
| lambda | 4.9792 |

Unknowns after Convergence:

|  |  |
| --- | --- |
| tX (m) | 99.5015 |
| tY (m) | -628.5543 |
| tZ (m) | 1842.1882 |
| omega (dd) | -1.4782 |
| phi (dd) | -0.1833 |
| kappa (dd) | -90.1950 |
| lambda | 4.9791 |

Task 2:

I compared the old omega value to the new updated value. If the absolute value of the difference is less than 1e-5, we stop iterating. With this set of data, we had **2 iterations** until convergence.

Task 3:

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **vX** | **vY** | **vZ** |
| **100** | -0.0104 | 0.0155 | 0.0069 |
| **104** | -0.0244 | -0.0295 | -0.0124 |
| **105** | -0.0109 | 0.0331 | -0.0104 |
|  |  |  |  |
| **RMS** | 0.0166 | 0.0271 | 0.0102 |

Task 4:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Image** | **Xm (mm)** | **Ym (mm)** | **Zm (mm)** | **Xo (m)** | **Yo (m)** | **Zo (m)** |
| **Left** | 0.00 | 0.00 | 0.00 | 99.5015 | -628.5543 | 1842.1882 |
| **Right** | 92.00 | -1.422 | -1.287 | 73.1077 | -170.529950 | 1852.1839 |

Task 5:

Initial Conditions:

|  |  |
| --- | --- |
| tX (m) | 80.0196 |
| tY (m) | -631.1243 |
| tZ (m) | 1856.1932 |
| omega (dd) | 0.0 |
| phi (dd) | 0.0 |
| kappa (dd) | -1.5741 |
| lambda | 4.9796 |

Unknowns after Convergence:

|  |  |
| --- | --- |
| tX (m) | 99.6227 |
| tY (m) | -628.7429 |
| tZ (m) | 1842.1011 |
| omega (dd) | -1.4782 |
| phi (dd) | -0.1719 |
| kappa (dd) | -90.1950 |
| lambda | 4.9799 |

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **vX** | **vY** | **vZ** |
| **200** | 0.0272 | 0.0102 | -0.0582 |
| **201** | 0.0511 | 0.0313 | 0.0542 |
| **202** | 0.0343 | -0.0113 | 0.0156 |
| **203** | 0.0297 | -0.0167 | -0.0232 |
|  |  |  |  |
| **RMS** | 0.0368 | 0.0193 | 0.0421 |

Transformed Object Points:

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Xo (m)** | **Yo (m)** | **Zo (m)** |
| **200** | -466.3628 | -542.2998 | 1091.4918 |
| **201** | 42.7811 | -412.1587 | 1090.8742 |
| **202** | 321.1243 | -667.4613 | 1083.5056 |
| **203** | 527.8097 | -375.7367 | 1091.9768 |

Task 6:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Correlation Coefficient Matrix | | | | | | |
| 1 | 0.99997 | 0.99972 | -0.99902 | 0.999852 |  |  |
| 0.99997 | 1 | 0.999507 | -0.99865 | 0.99969 |  |  |
| 0.99972 | 0.999507 | 1 | -0.99979 | 0.999979 |  |  |
| -0.99902 | -0.99865 | -0.99979 | 1 | -0.99964 |  |  |
| 0.999852 | 0.99969 | 0.999979 | -0.99964 | 1 |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |