**Report of Lab4**

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**1. Computation Methods**

**1.1 exercise 1**

1) Calculate and check sizes

2) Calculate

Where is given from Lecture Notes (calculated from ,which is given)

3) Calculate

The series expansion formula is given, but in order to determine the coefficients, N, M, t and η should be calculated first:

4) Calculate the final X and Y

5) Calculate the meridian convergence c and the distortion (scale) λ

Using the given series expansion with N, M, t and η obtained from 4) to get the final results of c and λ

**1.2 exercise 2**

1) Calculate x and y

Using results from exercise 1 to obtain x and y

And check the sizes

Where

Where is given from Lecture Notes(calculated from ,which is given)

2) Calculate

The series expansion formula is given, to determine the coefficients, the N, M, t and η from exercise 1 should be used.

3) Calculate final results L and B

4) Calculate the influence of changed geometry

Using the lat2mar function, we can calculate the arc lengths of each ellipsoidal latitude, the difference of them is the influence of the changed geometry.

**[Remark]**

* Both exercises should consider both Gauss-Kruger and UTM projection, i.e. the is different
* during the computation process, the unit of angle is rad, and the final result should be retransformed to degree.

**2. Results of Yi Wang**

**2.1 exercise 1**

|  |  |  |
| --- | --- | --- |
|  | Gauss-Kruger | UTM |
| **False Easting Y** | 3567866.6275 m | 567839.4809 m |
| **False Northing X** | 5320263.6571 m | 5318135.5516 m |
| **Convergence c** |  |  |
| **Distortion Λ** | 1.0000565714 | 0.9996565488 |

**2.2 exercise 2**

|  |  |  |
| --- | --- | --- |
|  | Gauss-Kruger | UTM |
| **Latitude B** |  |  |
| **Longitude L** |  |  |
| **Convergence c** |  |  |
| **Distortion Λ** | 1.0000565845 | 0.9996565620 |

**2.3 influence**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **GRS80** | **Bessel** | **Difference** |
| **Latitude B** |  |  |  |
| **Longitude L** |  |  |  |

**The influence in meter is**

**3. Results of Yifei Zheng**