Transformation

0.1

Erzeugt von Doxygen 1.8.17

Kapitel 1

Coordinate Transformation

Zu beachten

For educational purposes only

Copyright

Version

0.1

Autor

Norbert Rösch
Steven Landgraf
Jessica Palka
Wentao Lu
Svea Krikau
Xiaofei Yang

Bemerkungen

Steven Landgraf

- classSpatialSimilarityTransformationInfinTest
- Tests the Spatial Similarity Transformation as a Datum Strategy.
- class MolokiiTransformationStandardTestdens
- Tests the Molodenskii Transformation Standard as a Datum Strategy.

Jessica Palka

- class MockStrategyTest

- Test class with two integration tests to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip and vice versa. The datumstrategy "MockStrategy" is used.

Svea Krikau

- class MolodenskiiTransformationAbridged
- Algorithmic realization of the abridged molodensky transformation
- class MolodenskiiTransformationAbridgedTest
- Test of the algorithmic realization of the abridged molodensky transformation

Wentao Lu

- class SpatialSimilarityTransformationTrigTest
- Tests the Spatial Similarity Transformation as a Datum Strategy

Xiaofei Yang

- Update documentations,make web pages and Latex

Kapitel 2

Trafo

This is the repository of the course Fortgeschrittene Konzepte in GIS (2019/2020) at the Geodetic Institute in Karlsruhe. It contains Java code for several geodetic transformations integrated in a single programm. The course focuses on learning software engineering skills and design patterns such as singleton or factory method (creational patterns). The program is based on a structure design pattern of a Model View Controller.

This code is open source and everyone is invited to participate to this repository. Please feel free to pick open Issues and send Pull Requests (see section Contributing below).

Getting Started

These instructions will get you a copy of the project up and running on your local machine for development and testing purposes.

Prerequisites

Java-compiler or -IDE (e.g. Eclipse: https://www.eclipse.org/).

JUnit (at least Version 3 is recommended) to run the implemented tests.

Installing

Just clone the repository.

```
git clone repo@gik-ubuntu-09.gik.kit.edu/Trafo
```

And start as a Java project with your favorite compiler/IDE (e.g. Eclipse).

The project should run without any Errors.

Running the tests

Several Unit tests are already implemented.

Break down into end to end tests (Todo: Delete this section?)

Explain what these tests test and why
`Give an example`

And coding style tests (Todo: Delete this section?)

Explain what these tests test and why
`Give an example`

Contributing

When contributing to this repository, please first discuss the change you wish to make via issue, email, or any other method with the owners of this repository before making a change and submit pull requests.

Versioning

For the versions available, see the `tags on this repository`.

Authors

- **Norbert Roesch** - *Initial work* -
- **Wentao Lu**
- **Jessica Palka**
- **Xiaofei Yang**
- **Steven Landgraf**
- **Svea Krikau**

See also the list of `contributors` who participated in this project.

License

This project is licensed under the GNU License - see the LICENSE.md file for details

Acknowledgments

- We acknowledge all authors and participants who contributed to this project. Thank You.

Kapitel 3

Verzeichnis der Namensbereiche

3.1 Pakete

Hier folgen die Pakete mit einer Kurzbeschreibung (wenn verfügbar):

Kapitel 4

Hierarchie-Verzeichnis

4.1 Klassenhierarchie

Die Liste der Ableitungen ist -mit Einschränkungen- alphabetisch sortiert:

Kapitel 5

Klassen-Verzeichnis

5.1 Auflistung der Klassen

Hier folgt die Aufzählung aller Klassen, Strukturen, Varianten und Schnittstellen mit einer Kurzbeschreibung:

Kapitel 6

Datei-Verzeichnis

6.1 Auflistung der Dateien

Hier folgt die Aufzählung aller Dateien mit einer Kurzbeschreibung:

Kapitel 7

Dokumentation der Namensbereiche

7.1 Paket coordinates

Klassen

- class Coordinate

  Abstract class that represents a coordinate. Enables any concrete Coordinate class be used as input for TransformationStrategy which relies on geographic coordinates as input/output

- class Gauss

  Class Gauss extends class Coordinate.

- class GaussKrueger

  Coordinate point relating to a certain Gauss-Krueger reference meridian.

- class GeographicCoordinate

  concrete implementation of abstract class Coordinate, represents a geographic coordinate (as input coordinate)

- class GeographicCoordinateInterface

  concrete implementation of abstract class Coordinate, represents a geographic coordinate (As interface for strategy)

- class GetAppropriateCoordinate

  Coordinate factory for plane coordinates and geographic coordinates.

- class Soldner

  Class Soldner extends class Coordinate.

- class UTM

  Class UTM extends class Gauss.

- class XYZCoordinate

  Class XYZCoordinate.

7.2 Paket datumstrategy

Klassen

- class CardansTransformation

  Algorithmic realization of Translation and the Cardan's Rotation.

- class EulersTransformation

Algorithmic realization of the Euler's transformation.

- class GetAppropriateTransformationAlgorithm
- class MockStrategy
- class MolodenskiiTransformationAbridged

  Algorithmic realization of the abridged molodensky transformation.
- class MolodenskiiTransformationStandard

  Algorithmic realization of the molodensky transformation.
- class SpatialSimilarityTransformationInfin

  Algorithmic realization of the 3D similarity transformation also known as 7-parameter transformation.
- class SpatialSimilarityTransformationTrig
- class TransformationStrategy

  abstract class that encapsulates transformation algorithms for different coordinates
  the concrete transformation algorithms that are implemented by the child classes of TransformationStrategy implement the abstract method transform(GeographicCoordinateInterface) that performs the transformation with geographic coordinates as input/output

7.3 Paket params

Klassen

- class ControlParms

  Class ControlParms extends class EllipsoidParms.
- class EllipsoidParms

  Ellipsoid parameters.
- class LatParm

  Latitude Parameters.
- class MolodenskyParm

  Molodensky Parameters.
- class SpatialSimilarityTransformParm

  Spatial similarity transform parameters.

7.4 Paket test

Pakete

- package coordinates
- package datumstrategy
- package params

7.5 Paket test.coordinates

Klassen

- class AllTests
- class CoordinateFactoryTest

  Coordinate factory for plane coordinates and geographic coordinates.
- class GaussKruegerTest

  Test class with unit tests to test behavior class GaussKrueger.
- class GaussTest

  Test class with unit tests to test behavior class Gauss.
- class GeographicCoordinateTest
- class UTMTest
- class XYZCoordinateTest

7.6 Paket test.datumstrategy

Klassen

- class GetAppropriateTransformationAlgorithmTest
- class MockStrategyTest

  Test class with two integration tests to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip and vice versa. The datumstrategy "MockStrategy" is used.
- class MolodenskiiTransformationAbridgedTest

  Test of the algorithmic realization of the abridged molodensky transformation.
- class MolodenskiiTransformationStandardTest

  Tests the Molodenskii Transformation Standard as a Datum Strategy. Input values and expected values were calculated by hand.
- class SpatialSimilarityTransformationInfinTest

  Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.
- class SpatialSimilarityTransformationTrigTest

  Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

7.7 Paket test.params

Klassen

- class LatParmTest

Kapitel 8

Klassen-Dokumentation

8.1 test.coordinates.AllTests Klassenreferenz

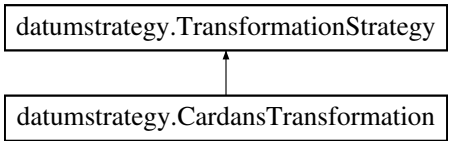
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/AllTests.java

8.2 datumstrategy.CardansTransformation Klassenreferenz

Algorithmic realization of Translation and the Cardan's Rotation.

Klassendiagramm für datumstrategy.CardansTransformation:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)

  Use Cardan's Rotation to transform the geographic coordinate.

Private Attribute

- double e1
- double e2
- double e3
- double e4
- double e5
- double e6
- double e7
- double e8
- double e9

8.2.1 Ausführliche Beschreibung

Algorithmic realization of Translation and the Cardan's Rotation.

The method takes all needed parameters from the class ControlParms that extends the class EllipsoidParms. Needed parameter for the Transformation: 3 translation-, 1 scale- and 3 rotation -parameters. The start coordinates are taken from the class GeographicCoordinate and have to be converted into cartesian coordinates to realize the transformation. The Cardan's Rotation is done with trigonometric funtion. After the Transformation, the new coordinates are converted into ellipsoidal coordinates by an iterative process.

source of cardan's rotation: http://www.itm.uni-stuttgart.de/courses/madyn/Merkblaetter/↩M08.pdf (in Germany) Concept explanation : http://n.ethz.ch/~roclaudi/download/4.↩Semster/glossarium%20h%F7ge.pdf

Autor

Yucheng Luo

Bemerkungen

Cardan's rotation matrix added on 01.02.2018 by Yucheng Luo

Version

0.1

8.2.2 Dokumentation der Elementfunktionen

8.2.2.1 transform()

```
void datumstrategy.CardansTransformation.transform (
            GeographicCoordinateInterface geo )
```

Use Cardan's Rotation to transform the geographic coordinate.

Translation : Cartesian coordinates are used. Rotation : rotate with principle of conventional Cardan's Rotation (Wx,Wy,Wz). Algorithm explanation : Rotate first about X-axis ,after first step rotate about current Y-axis ,at end rotate about current Z-axis.

Autor

Yucheng Luo

Erneute Implementation von datumstrategy.TransformationStrategy.

8.2.3 Dokumentation der Datenelemente

8.2.3.1 e1

```
double datumstrategy.CardansTransformation.e1  [private]
```

8.2.3.2 e2

```
double datumstrategy.CardansTransformation.e2  [private]
```

8.2.3.3 e3

```
double datumstrategy.CardansTransformation.e3  [private]
```

8.2.3.4 e4

```
double datumstrategy.CardansTransformation.e4  [private]
```

8.2.3.5 e5

```
double datumstrategy.CardansTransformation.e5  [private]
```

8.2.3.6 e6

```
double datumstrategy.CardansTransformation.e6  [private]
```

8.2.3.7 e7

```
double datumstrategy.CardansTransformation.e7  [private]
```

8.2.3.8 e8

```
double datumstrategy.CardansTransformation.e8  [private]
```

8.2.3.9 e9

```
double datumstrategy.CardansTransformation.e9  [private]
```

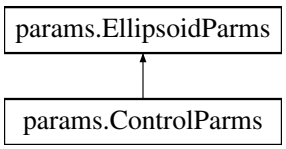
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/CardansTransformation.java

8.3 params.ControlParms Klassenreferenz

Class ControlParms extends class EllipsoidParms.

Klassendiagramm für params.ControlParms:



Öffentliche Methoden

- void print ()
  print outputs of class params.ControlParms
- String getPointid ()
  getter method that returns the id of the particular Coordinate point
- void setPointid (String pointid)
  setter method that accepts id for the particular Coordinate point
- long getPoint_number ()
  getter method that returns point number of the particular Coordinate point
- void setPoint_number (long point_number)
  setter method that accepts point number for the particular Coordinate point
- String getFromprojection ()
- void setFromprojection (String fromprojection)
- String getFromdatum ()
- void setFromdatum (String fromdatum)
- double getFromawert ()
- void setFromawert (double fromawert)
- double getFrombwert ()
- void setFrombwert (double frombwert)
- double getSourceCoordinateX ()
- void setSourceCoordinateX (double sourceCoordinateX)
- double getSourceCoordinateY ()
- void setSourceCoordinateY (double sourceCoordinateY)
- double getSourceCoordinateZ ()
- void setSourceCoordinateZ (double sourceCoordinateZ)
- String getToprojection ()
- void setToprojection (String toprojection)
- String getTodatum ()
- void setTodatum (String todatum)

- double getToawert ()
- void setToawert (double toawert)
- double getTobwert ()
- void setTobwert (double tobwert)
- boolean isChangedatum ()
- void setChangedatum (boolean changedatum)
- String getNorthhem ()
- void setNorthhem (String northhem)
- String getKindofhoehe ()
- void setKindofhoehe (String kindofhoehe)
- String getKindoftrafo ()
- void setKindoftrafo (String kindoftrafo)
- double getDx ()
- void setDx (double dx)
- double getDy ()
- void setDy (double dy)
- double getDz ()
- void setDz (double dz)
- double getDa ()
- void setDa (double da)
- double getDf ()
- void setDf (double df)
- double getWx ()
- void setWx (double wx)
- double getWy ()
- void setWy (double wy)
- double getWz ()
- void setWz (double wz)
- double getRz1 ()
- void setRz1 (double Rz1)
- double getRx2 ()
- void setRx2 (double Rx2)
- double getRz3 ()
- void setRz3 (double Rz3)
- double getMassstab ()
- void setMassstab (double massstab)
- double getDestinationCoordinateX ()
- void setDestinationCoordinateX (double destinationCoordinateX)
- double getDestinationCoordinateY ()
- void setDestinationCoordinateY (double destinationCoordinateY)
- double getDestinationCoordinateZ ()
- void setDestinationCoordinateZ (double destinationCoordinateZ)
- String getFileinput ()
- void setFileinput (String fileinput)
- String getFileoutput ()
- void setFileoutput (String fileoutput)
- String getQupkt ()
- void setQupkt (String qupkt)
- String getQutausch ()
- void setQutausch (String qutausch)
- String getAusgabetyp ()
- void setAusgabetyp (String ausgabetyp)
- String getZipkt ()
- void setZipkt (String zipkt)
- String getZihoehe ()
- void setZihoehe (String zihoehe)
- String getZitausch ()
- void setZitausch (String zitausch)

Öffentliche, statische Methoden

- static ControlParms getInstance ()

  Singleton getinstance.

Private Methoden

- ControlParms ()

  private constructor for singleton

Private Attribute

- String pointid
- long point_number
- String fromprojection
- String fromdatum
- double fromawert
- double frombwert
- double sourceCoordinateX
- double sourceCoordinateY
- double sourceCoordinateZ
- String toprojection
- String todatum
- double toawert
- double tobwert
- boolean changedatum
- String northhem
- String kindofhoehe
- String kindoftrafo
- double dx
- double dy
- double dz
- double da
- double df
- double wx
- double wy
- double wz
- double Rz1
- double Rx2
- double Rz3
- double massstab
- double destinationCoordinateX
- double destinationCoordinateY
- double destinationCoordinateZ
- String fileinput
- String fileoutput
- String qupkt
- String qutausch
- String ausgabetyp
- String zipkt
- String zihoehe
- String zitausch

Statische, private Attribute

- static ControlParms instance = null

8.3.1 Ausführliche Beschreibung

Class ControlParms extends class EllipsoidParms.

Bemerkungen

last refactored 11.12.2017 by Eva Majer

- adaptions for ControlParms Singleton
- Translation of some comments
- Translation of print method output

add some comments on 2018-01-06 by Yunhao Huang

8.3.2 Beschreibung der Konstruktoren und Destruktoren

8.3.2.1 ControlParms()

```
params.ControlParms.ControlParms ( )  [private]
```

private constructor for singleton

8.3.3 Dokumentation der Elementfunktionen

8.3.3.1 getAusgabetyp()

```
String params.ControlParms.getAusgabetyp ( )
```

8.3.3.2 getDa()

```
double params.ControlParms.getDa ( )
```

8.3.3.3 getDestinationCoordinateX()

```
double params.ControlParms.getDestinationCoordinateX ( )
```

8.3.3.4 getDestinationCoordinateY()

```
double params.ControlParms.getDestinationCoordinateY ( )
```

8.3.3.5 getDestinationCoordinateZ()

```
double params.ControlParms.getDestinationCoordinateZ ( )
```

8.3.3.6 getDf()

```
double params.ControlParms.getDf ( )
```

8.3.3.7 getDx()

```
double params.ControlParms.getDx ( )
```

8.3.3.8 getDy()

```
double params.ControlParms.getDy ( )
```

8.3.3.9 getDz()

```
double params.ControlParms.getDz ( )
```

8.3.3.10 getFileinput()

```
String params.ControlParms.getFileinput ( )
```

8.3.3.11 getFileoutput()

```
String params.ControlParms.getFileoutput ( )
```

8.3.3.12 getFromawert()

```
double params.ControlParms.getFromawert ( )
```

8.3.3.13 getFrombwert()

```
double params.ControlParms.getFrombwert ( )
```

8.3.3.14 getFromdatum()

```
String params.ControlParms.getFromdatum ( )
```

8.3.3.15 getFromprojection()

```
String params.ControlParms.getFromprojection ( )
```

8.3.3.16 getInstance()

```
static ControlParms params.ControlParms.getInstance ( )  [static]
```

Singleton getinstance.

8.3.3.17 getKindofhoehe()

```
String params.ControlParms.getKindofhoehe ( )
```

8.3.3.18 getKindoftrafo()

```
String params.ControlParms.getKindoftrafo ( )
```

8.3.3.19 getMassstab()

```
double params.ControlParms.getMassstab ( )
```

8.3.3.20 getNorthhem()

```
String params.ControlParms.getNorthhem ( )
```

8.3.3.21 getPoint_number()

```
long params.ControlParms.getPoint_number ( )
```

getter method that returns point number of the particular Coordinate point

Rückgabe

point_number - returns the point number of the particular Coordinate point as long value

8.3.3.22 getPointid()

```
String params.ControlParms.getPointid ( )
```

getter method that returns the id of the particular Coordinate point

Rückgabe

pointid - string representing the point identification number

8.3.3.23 getQupkt()

```
String params.ControlParms.getQupkt ( )
```

8.3.3.24 getQutausch()

```
String params.ControlParms.getQutausch ( )
```

8.3.3.25 getRx2()

```
double params.ControlParms.getRx2 ( )
```

8.3.3.26 getRz1()

```
double params.ControlParms.getRz1 ( )
```

8.3.3.27 getRz3()

```
double params.ControlParms.getRz3 ( )
```

8.3.3.28 getSourceCoordinateX()

```
double params.ControlParms.getSourceCoordinateX ( )
```

8.3.3.29 getSourceCoordinateY()

```
double params.ControlParms.getSourceCoordinateY ( )
```

8.3.3.30 getSourceCoordinateZ()

```
double params.ControlParms.getSourceCoordinateZ ( )
```

8.3.3.31 getToawert()

```
double params.ControlParms.getToawert ( )
```

8.3.3.32 getTobwert()

```
double params.ControlParms.getTobwert ( )
```

8.3.3.33 getTodatum()

```
String params.ControlParms.getTodatum ( )
```

8.3.3.34 getToprojection()

```
String params.ControlParms.getToprojection ( )
```

8.3.3.35 getWx()

```
double params.ControlParms.getWx ( )
```

8.3.3.36 getWy()

```
double params.ControlParms.getWy ( )
```

8.3.3.37 getWz()

```
double params.ControlParms.getWz ( )
```

8.3.3.38 getZihoehe()

```
String params.ControlParms.getZihoehe ( )
```

8.3.3.39 getZipkt()

```
String params.ControlParms.getZipkt ( )
```

8.3.3.40 getZitausch()

```
String params.ControlParms.getZitausch ( )
```

8.3.3.41 isChangedatum()

```
boolean params.ControlParms.isChangedatum ( )
```

8.3.3.42 print()

```
void params.ControlParms.print ( )
```

print outputs of class params.ControlParms

Autor

unknown

Bemerkungen

updated header 2018-01-06 by Yunhao Huang

Erneute Implementation von params.EllipsoidParms.

8.3.3.43 setAusgabetyp()

```
void params.ControlParms.setAusgabetyp (
            String ausgabetyp )
```

8.3.3.44 setChangedatum()

```
void params.ControlParms.setChangedatum (
            boolean changedatum )
```

8.3.3.45 setDa()

```
void params.ControlParms.setDa (
            double da )
```

8.3.3.46 setDestinationCoordinateX()

```
void params.ControlParms.setDestinationCoordinateX (
            double destinationCoordinateX )
```

8.3.3.47 setDestinationCoordinateY()

```
void params.ControlParms.setDestinationCoordinateY (
            double destinationCoordinateY )
```

8.3.3.48 setDestinationCoordinateZ()

```
void params.ControlParms.setDestinationCoordinateZ (
            double destinationCoordinateZ )
```

8.3.3.49 setDf()

```
void params.ControlParms.setDf (
            double df )
```

8.3.3.50 setDx()

```
void params.ControlParms.setDx (
            double dx )
```

8.3.3.51 setDy()

```
void params.ControlParms.setDy (
            double dy )
```

8.3.3.52 setDz()

```
void params.ControlParms.setDz (
            double dz )
```

8.3.3.53 setFileinput()

```
void params.ControlParms.setFileinput (
            String fileinput )
```

8.3.3.54 setFileoutput()

```
void params.ControlParms.setFileoutput (
            String fileoutput )
```

8.3.3.55 setFromawert()

```
void params.ControlParms.setFromawert (
            double fromawert )
```

8.3.3.56 setFrombwert()

```
void params.ControlParms.setFrombwert (
            double frombwert )
```

8.3.3.57 setFromdatum()

```
void params.ControlParms.setFromdatum (
            String fromdatum )
```

8.3.3.58 setFromprojection()

```
void params.ControlParms.setFromprojection (
            String fromprojection )
```

8.3.3.59 setKindofhoehe()

```
void params.ControlParms.setKindofhoehe (
            String kindofhoehe )
```

8.3.3.60 setKindoftrafo()

```
void params.ControlParms.setKindoftrafo (
            String kindoftrafo )
```

8.3.3.61 setMassstab()

```
void params.ControlParms.setMassstab (
            double massstab )
```

8.3.3.62 setNorthhem()

```
void params.ControlParms.setNorthhem (
            String northhem )
```

8.3.3.63 setPoint_number()

```
void params.ControlParms.setPoint_number (
            long point_number )
```

setter method that accepts point number for the particular Coordinate point

Parameter

point_number	- a long value representing the point number for the particular Coordinate point

8.3.3.64 setPointid()

```
void params.ControlParms.setPointid (
            String pointid )
```

setter method that accepts id for the particular Coordinate point

Parameter

pointid	- string representing the point identification number

8.3.3.65 setQupkt()

```
void params.ControlParms.setQupkt (
            String qupkt )
```

8.3.3.66 setQutausch()

```
void params.ControlParms.setQutausch (
            String qutausch )
```

8.3.3.67 setRx2()

```
void params.ControlParms.setRx2 (
            double Rx2 )
```

8.3.3.68 setRz1()

```
void params.ControlParms.setRz1 (
            double Rz1 )
```

8.3.3.69 setRz3()

```
void params.ControlParms.setRz3 (
            double Rz3 )
```

8.3.3.70 setSourceCoordinateX()

```
void params.ControlParms.setSourceCoordinateX (
            double sourceCoordinateX )
```

8.3.3.71 setSourceCoordinateY()

```
void params.ControlParms.setSourceCoordinateY (
            double sourceCoordinateY )
```

8.3.3.72 setSourceCoordinateZ()

```
void params.ControlParms.setSourceCoordinateZ (
            double sourceCoordinateZ )
```

8.3.3.73 setToawert()

```
void params.ControlParms.setToawert (
            double toawert )
```

8.3.3.74 setTobwert()

```
void params.ControlParms.setTobwert (
            double tobwert )
```

8.3.3.75 setTodatum()

```
void params.ControlParms.setTodatum (
            String todatum )
```

8.3.3.76 setToprojection()

```
void params.ControlParms.setToprojection (
            String toprojection )
```

8.3.3.77 setWx()

```
void params.ControlParms.setWx (
            double wx )
```

8.3.3.78 setWy()

```
void params.ControlParms.setWy (
            double wy )
```

8.3.3.79 setWz()

```
void params.ControlParms.setWz (
            double wz )
```

8.3.3.80 setZihoehe()

```
void params.ControlParms.setZihoehe (
            String zihoehe )
```

8.3.3.81 setZipkt()

```
void params.ControlParms.setZipkt (
            String zipkt )
```

8.3.3.82 setZitausch()

```
void params.ControlParms.setZitausch (
            String zitausch )
```

8.3.4 Dokumentation der Datenelemente

8.3.4.1 ausgabetyp

```
String params.ControlParms.ausgabetyp  [private]
```

8.3.4.2 changedatum

```
boolean params.ControlParms.changedatum  [private]
```

True/False means with/without datum changement

8.3.4.3 da

```
double params.ControlParms.da  [private]
```

Difference in large semi axis (For Molodenskii-Transformation)

8.3.4.4 destinationCoordinateX

```
double params.ControlParms.destinationCoordinateX  [private]
```

Currently not used

8.3.4.5 destinationCoordinateY

```
double params.ControlParms.destinationCoordinateY  [private]
```

Currently not used

8.3.4.6 destinationCoordinateZ

```
double params.ControlParms.destinationCoordinateZ  [private]
```

Currently not used

8.3.4.7 df

```
double params.ControlParms.df  [private]
```

Difference flattening (For Molodenskii-Transformation)

8.3.4.8 dx

```
double params.ControlParms.dx  [private]
```

Translation X (For Molodenskii und 3D similarity transformation)

8.3.4.9 dy

```
double params.ControlParms.dy  [private]
```

Translation Y (For Molodenskii und 3D similarity transformation)

8.3.4.10 dz

```
double params.ControlParms.dz  [private]
```

Translation Z (For Molodenskii und 3D similarity transformation)

8.3.4.11 fileinput

```
String params.ControlParms.fileinput  [private]
```

8.3.4.12 fileoutput

```
String params.ControlParms.fileoutput  [private]
```

8.3.4.13 fromawert

```
double params.ControlParms.fromawert  [private]
```

8.3.4.14 frombwert

```
double params.ControlParms.frombwert  [private]
```

8.3.4.15 fromdatum

```
String params.ControlParms.fromdatum  [private]
```

8.3.4.16 fromprojection

```
String params.ControlParms.fromprojection  [private]
```

8.3.4.17 instance

```
ControlParms params.ControlParms.instance = null  [static], [private]
```

Singleton

8.3.4.18 kindofhoehe

```
String params.ControlParms.kindofhoehe  [private]
```

Height calculation

8.3.4.19 kindoftrafo

```
String params.ControlParms.kindoftrafo  [private]
```

Kind of transformation (e.g. 3D similarity transformation)

8.3.4.20 massstab

```
double params.ControlParms.massstab  [private]
```

Scale (For 3D similarity transformation)

8.3.4.21 northhem

```
String params.ControlParms.northhem  [private]
```

Hemisphere

8.3.4.22 point_number

```
long params.ControlParms.point_number  [private]
```

8.3.4.23 pointid

```
String params.ControlParms.pointid  [private]
```

8.3.4.24 qupkt

```
String params.ControlParms.qupkt  [private]
```

8.3.4.25 qutausch

```
String params.ControlParms.qutausch  [private]
```

8.3.4.26 Rx2

```
double params.ControlParms.Rx2  [private]
```

second Rotation about current X (For Eulerstransformation)

8.3.4.27 Rz1

```
double params.ControlParms.Rz1  [private]
```

first Rotation about current Z (For Eulerstransformation)

8.3.4.28 Rz3

```
double params.ControlParms.Rz3  [private]
```

third Rotation about current Z (For Eulerstransformation)

8.3.4.29 sourceCoordinateX

```
double params.ControlParms.sourceCoordinateX  [private]
```

Input coordinate X

8.3.4.30 sourceCoordinateY

```
double params.ControlParms.sourceCoordinateY  [private]
```

Input coordinate Y

8.3.4.31 sourceCoordinateZ

```
double params.ControlParms.sourceCoordinateZ  [private]
```

Input coordinate Z

8.3.4.32 toawert

```
double params.ControlParms.toawert  [private]
```

8.3.4.33 tobwert

```
double params.ControlParms.tobwert  [private]
```

8.3.4.34 todatum

```
String params.ControlParms.todatum  [private]
```

8.3.4.35 toprojection

```
String params.ControlParms.toprojection  [private]
```

8.3.4.36 wx

```
double params.ControlParms.wx  [private]
```

Rotation X (For 3D similarity transformation)

8.3.4.37 wy

```
double params.ControlParms.wy  [private]
```

Rotation Y (For 3D similarity transformation)

8.3.4.38 wz

```
double params.ControlParms.wz  [private]
```

Rotation Z (For 3D similarity transformation)

8.3.4.39 zihoehe

```
String params.ControlParms.zihoehe  [private]
```

8.3.4.40 zipkt

```
String params.ControlParms.zipkt  [private]
```

8.3.4.41 zitausch

```
String params.ControlParms.zitausch  [private]
```

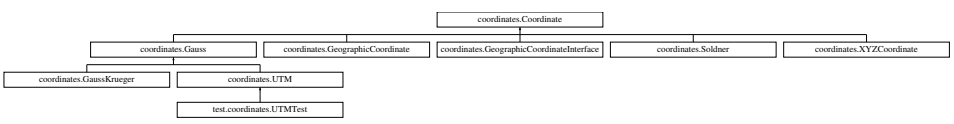
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- params/ControlParms.java

8.4 coordinates.Coordinate Klassenreferenz

Abstract class that represents a coordinate. Enables any concrete Coordinate class be used as input for TransformationStrategy which relies on geographic coordinates as input/output

Klassendiagramm für coordinates.Coordinate:



Öffentliche Methoden

- abstract GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ellipsoidParms)

  abstract method that allows the concrete Coordinate instance to be convertable to GeographicCoordinate
- abstract void getAsTargetCoordinate (EllipsoidParms ellipsoidParms, GeographicCoordinateInterface geographicCoordinate)

  abstract method that allows the concrete Coordinate instance to be convertable from GeographicCoordinate
- abstract void print ()

  abstract methnd that allows the concrete Coordinate to be output on screen
- String getPointid ()

  getter method that returns the id of the particular Coordinate point
- void setPointid (String pointid)

  setter method that accepts id for the particular Coordinate point

Private Attribute

- String pointid

8.4.1 Ausführliche Beschreibung

Abstract class that represents a coordinate. Enables any concrete Coordinate class be used as input for TransformationStrategy which relies on geographic coordinates as input/output

Autor

unknown

Bemerkungen

updated header on 2017-11-29 by Markus Mueller

renamed to Coordinate (was Coordinates) on 2016-11-26 by Patrick Huebner

added abstract methods getAsGeographic and fromGeographic to enable any concrete Coordinate class be used as input for TransformationStrategy which relies on geographic coordinates as input/output on 2016-11-26 by Patrick Huebner

Version

0.1

Parameter

pointid	- string representing the point identification number

8.4.2 Dokumentation der Elementfunktionen

8.4.2.1 getAsGeographicInterface()

```
abstract GeographicCoordinateInterface coordinates.Coordinate.getAsGeographicInterface (
            EllipsoidParms ellipsoidParms )  [abstract]
```

abstract method that allows the concrete Coordinate instance to be convertable to GeographicCoordinate

Parameter

ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate should refer to

Erneute Implementation in coordinates.GeographicCoordinateInterface, coordinates.GeographicCoordinate, coordinates.Soldner, coordinates.XYZCoordinate, coordinates.GaussKrueger, coordinates.UTM und coordinates.Gauss.

8.4.2.2 getAsTargetCoordinate()

```
abstract void coordinates.Coordinate.getAsTargetCoordinate (
            EllipsoidParms ellipsoidParms,
            GeographicCoordinateInterface geographicCoordinate )  [abstract]
```

abstract method that allows the concrete Coordinate instance to be convertable from GeographicCoordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinate that represents the geographic coordinate the concrete Coordinate instance should be converted from
ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate refers to

Erneute Implementation in coordinates.GeographicCoordinateInterface, coordinates.GeographicCoordinate, coordinates.XYZCoordinate, coordinates.Soldner, coordinates.GaussKrueger und coordinates.UTM.

8.4.2.3 getPointid()

```
String coordinates.Coordinate.getPointid ( )
```

getter method that returns the id of the particular Coordinate point

Rückgabe

pointid - string representing the point identification number

8.4.2.4 print()

```
abstract void coordinates.Coordinate.print ( )  [abstract]
```

abstract methnd that allows the concrete Coordinate to be output on screen

Erneute Implementation in coordinates.GeographicCoordinateInterface, coordinates.XYZCoordinate, coordinates.GeographicCoordin
coordinates.Soldner, coordinates.Gauss, coordinates.GaussKrueger und coordinates.UTM.

8.4.2.5 setPointid()

```
void coordinates.Coordinate.setPointid (
            String pointid )
```

setter method that accepts id for the particular Coordinate point

Parameter

pointid	- string representing the point identification number

8.4.3 Dokumentation der Datenelemente

8.4.3.1 pointid

```
String coordinates.Coordinate.pointid  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/Coordinate.java

8.5 test.coordinates.CoordinateFactoryTest Klassenreferenz

Coordinate factory for plane coordinates and geographic coordinates.

Öffentliche Methoden

- void testGetCoordGK ()
- void testGetCoordUTM ()
- void testGetCoordSoldner ()
- void testGetCoordGeographic ()
- void testGetXYZ ()

8.5.1 Ausführliche Beschreibung

Coordinate factory for plane coordinates and geographic coordinates.

Autor

Norbert Roesch

Bemerkungen

January 2019 ensure the factory produces the right objects

Version

0.1

8.5.2 Dokumentation der Elementfunktionen

8.5.2.1 testGetCoordGeographic()

```
void test.coordinates.CoordinateFactoryTest.testGetCoordGeographic ( )
```

8.5.2.2 testGetCoordGK()

```
void test.coordinates.CoordinateFactoryTest.testGetCoordGK ( )
```

8.5.2.3 testGetCoordSoldner()

```
void test.coordinates.CoordinateFactoryTest.testGetCoordSoldner ( )
```

8.5.2.4 testGetCoordUTM()

```
void test.coordinates.CoordinateFactoryTest.testGetCoordUTM ( )
```

8.5.2.5 testGetXYZ()

```
void test.coordinates.CoordinateFactoryTest.testGetXYZ ( )
```

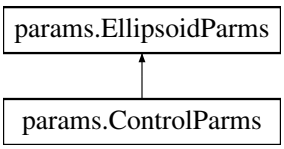
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/CoordinateFactoryTest.java

8.6 params.EllipsoidParms Klassenreferenz

Ellipsoid parameters.

Klassendiagramm für params.EllipsoidParms:



Öffentliche Methoden

- EllipsoidParms ()
  Constructor for the class params.EllipsoidParms.
- EllipsoidParms (double es2, double c)
  General constructor for the class params.EllipsoidParms.
- void calculatelongitudeParms (GeographicCoordinateInterface geo)
- void print ()
- String getId ()
- void setId (String id)
- double getC ()
- void setC (double c)
- double getSecondEccentricity ()
- void setSecondEccentricity (double es2)
- double getSemiMajorAxis ()
- void setSemiMajorAxis (double a)
- double getSemiMinorAxis ()
- void setSemiMinorAxis (double b)
- double getFlattening ()
- void setFlattening (double f)
- double getFirstEccentricity ()
- void setFirstEccentricity (double e2)
- String getToid ()
- void setToid (String toid)
- double getToc ()
- void setToc (double toc)
- double getToes2 ()
- void setToes2 (double toes2)
- double getToa ()
- void setToa (double toa)

- double getTob ()
- void setTob (double tob)
- double getTof ()
- void setTof (double tof)
- double getToe2 ()
- void setToe2 (double toe2)
- double getN ()
- void setN (double n)
- double getM ()
- void setM (double m)
- double getSoldner_l0 ()
- void setSoldner_l0 (double soldner_l0)
- double getSoldner_b0 ()
- void setSoldner_b0 (double soldner_b0)
- double getGK_refmer ()
- void setGK_refmer (double GK_refmer)

Private Attribute

- String id
- double c
- double secondEccentricity
- double semiMajorAxis
- double semiMinorAxis
- double flattening
- double firstEccentricity
- String toid
- double toc
- double toes2
- double toa
- double tob
- double tof
- double toe2
- double N
- double M
- double Soldner_l0
- double Soldner_b0
- double GK_refmer

8.6.1 Ausführliche Beschreibung

Ellipsoid parameters.

Autor

unknown

Bemerkungen

add header and some comments on 2018-01-06 by Yunhao Huang

8.6.2 Beschreibung der Konstruktoren und Destruktoren

8.6.2.1 EllipsoidParms() [1/2]

```
params.EllipsoidParms.EllipsoidParms ( )
```

Constructor for the class params.EllipsoidParms.

8.6.2.2 EllipsoidParms() [2/2]

```
params.EllipsoidParms.EllipsoidParms (
            double es2,
            double c )
```

General constructor for the class params.EllipsoidParms.

Transfer of two shape parameters

8.6.3 Dokumentation der Elementfunktionen

8.6.3.1 calculatelongitudeParms()

```
void params.EllipsoidParms.calculatelongitudeParms (
            GeographicCoordinateInterface geo )
```

8.6.3.2 getC()

```
double params.EllipsoidParms.getC ( )
```

8.6.3.3 getFirstEccentricity()

```
double params.EllipsoidParms.getFirstEccentricity ( )
```

8.6.3.4 getFlattening()

```
double params.EllipsoidParms.getFlattening ( )
```

8.6.3.5 getGK_refmer()

```
double params.EllipsoidParms.getGK_refmer ( )
```

8.6.3.6 getId()

```
String params.EllipsoidParms.getId ( )
```

8.6.3.7 getM()

```
double params.EllipsoidParms.getM ( )
```

8.6.3.8 getN()

```
double params.EllipsoidParms.getN ( )
```

8.6.3.9 getSecondEccentricity()

```
double params.EllipsoidParms.getSecondEccentricity ( )
```

8.6.3.10 getSemiMajorAxis()

```
double params.EllipsoidParms.getSemiMajorAxis ( )
```

8.6.3.11 getSemiMinorAxis()

```
double params.EllipsoidParms.getSemiMinorAxis ( )
```

8.6.3.12 getSoldner_b0()

```
double params.EllipsoidParms.getSoldner_b0 ( )
```

8.6.3.13 getSoldner_l0()

```
double params.EllipsoidParms.getSoldner_l0 ( )
```

8.6.3.14 getToa()

```
double params.EllipsoidParms.getToa ( )
```

8.6.3.15 getTob()

```
double params.EllipsoidParms.getTob ( )
```

8.6.3.16 getToc()

```
double params.EllipsoidParms.getToc ( )
```

8.6.3.17 getToe2()

```
double params.EllipsoidParms.getToe2 ( )
```

8.6.3.18 getToes2()

```
double params.EllipsoidParms.getToes2 ( )
```

8.6.3.19 getTof()

```
double params.EllipsoidParms.getTof ( )
```

8.6.3.20 getToid()

```
String params.EllipsoidParms.getToid ( )
```

8.6.3.21 print()

```
void params.EllipsoidParms.print ( )
```

Erneute Implementation in params.ControlParms.

8.6.3.22 setC()

```
void params.EllipsoidParms.setC (
            double c )
```

8.6.3.23 setFirstEccentricity()

```
void params.EllipsoidParms.setFirstEccentricity (
            double e2 )
```

8.6.3.24 setFlattening()

```
void params.EllipsoidParms.setFlattening (
            double f )
```

8.6.3.25 setGK_refmer()

```
void params.EllipsoidParms.setGK_refmer (
            double GK_refmer )
```

8.6.3.26 setId()

```
void params.EllipsoidParms.setId (
            String id )
```

8.6.3.27 setM()

```
void params.EllipsoidParms.setM (
            double m )
```

8.6.3.28 setN()

```
void params.EllipsoidParms.setN (
            double n )
```

8.6.3.29 setSecondEccentricity()

```
void params.EllipsoidParms.setSecondEccentricity (
            double es2 )
```

8.6.3.30 setSemiMajorAxis()

```
void params.EllipsoidParms.setSemiMajorAxis (
            double a )
```

8.6.3.31 setSemiMinorAxis()

```
void params.EllipsoidParms.setSemiMinorAxis (
            double b )
```

8.6.3.32 setSoldner_b0()

```
void params.EllipsoidParms.setSoldner_b0 (
            double soldner_b0 )
```

8.6.3.33 setSoldner_l0()

```
void params.EllipsoidParms.setSoldner_l0 (
            double soldner_l0 )
```

8.6.3.34 setToa()

```
void params.EllipsoidParms.setToa (
            double toa )
```

8.6.3.35 setTob()

```
void params.EllipsoidParms.setTob (
            double tob )
```

8.6.3.36 setToc()

```
void params.EllipsoidParms.setToc (
            double toc )
```

8.6.3.37 setToe2()

```
void params.EllipsoidParms.setToe2 (
            double toe2 )
```

8.6.3.38 setToes2()

```
void params.EllipsoidParms.setToes2 (
            double toes2 )
```

8.6.3.39 setTof()

```
void params.EllipsoidParms.setTof (
            double tof )
```

8.6.3.40 setToid()

```
void params.EllipsoidParms.setToid (
            String toid )
```

8.6.4 Dokumentation der Datenelemente

8.6.4.1 c

```
double params.EllipsoidParms.c  [private]
```

Radius of curvature

8.6.4.2 firstEccentricity

```
double params.EllipsoidParms.firstEccentricity  [private]
```

8.6.4.3 flattening

```
double params.EllipsoidParms.flattening  [private]
```

8.6.4.4 GK_refmer

```
double params.EllipsoidParms.GK_refmer  [private]
```

Parameters for converting geographic coordinates -> coordinates.GaussKrueger

8.6.4.5 id

```
String params.EllipsoidParms.id  [private]
```

ID

8.6.4.6 M

```
double params.EllipsoidParms.M  [private]
```

Radius M (only if necessary)

8.6.4.7 N

```
double params.EllipsoidParms.N  [private]
```

Radius N (only if necessary)

8.6.4.8 secondEccentricity

```
double params.EllipsoidParms.secondEccentricity  [private]
```

8.6.4.9 semiMajorAxis

```
double params.EllipsoidParms.semiMajorAxis  [private]
```

8.6.4.10 semiMinorAxis

```
double params.EllipsoidParms.semiMinorAxis  [private]
```

8.6.4.11 Soldner_b0

```
double params.EllipsoidParms.Soldner_b0  [private]
```

Parameters for converting geographic coordinates -> coordinates.Soldner

8.6.4.12 Soldner_l0

```
double params.EllipsoidParms.Soldner_l0  [private]
```

Parameters for converting geographic coordinates -> coordinates.Soldner

8.6.4.13 toa

```
double params.EllipsoidParms.toa  [private]
```

Semi-major axis (if change of datum)

8.6.4.14 tob

```
double params.EllipsoidParms.tob  [private]
```

Semi-minor axis (if change of datum)

8.6.4.15 toc

```
double params.EllipsoidParms.toc  [private]
```

Radius of curvature (if change of datum)

8.6.4.16 toe2

```
double params.EllipsoidParms.toe2  [private]
```

First eccentricity (if change of datum)

8.6.4.17 toes2

```
double params.EllipsoidParms.toes2  [private]
```

Second eccentricity (if change of datum)

8.6.4.18 tof

```
double params.EllipsoidParms.tof  [private]
```

Flattening (if change of datum)

8.6.4.19 toid

```
String params.EllipsoidParms.toid  [private]
```

ID (if change of datum)

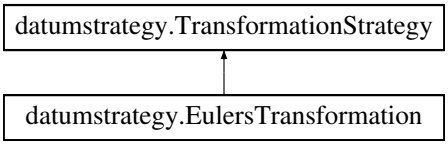
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- params/EllipsoidParms.java

8.7 datumstrategy.EulersTransformation Klassenreferenz

Algorithmic realization of the Euler's transformation.

Klassendiagramm für datumstrategy.EulersTransformation:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)

  Use Euler angles to transform the geographic coordinate.

Private Attribute

- double e1
- double e2
- double e3
- double e4
- double e5
- double e6
- double e7
- double e8
- double e9

8.7.1 Ausführliche Beschreibung

Algorithmic realization of the Euler's transformation.

The method takes all needed parameters from the class ControlParms that extends the class EllipsoidParms. Needed parameter for the EulersTransformation: 3 translation-, 1 scale- and 3 rotation -parameters. The start coordinates are taken from the class GeographicCoordinate and have to be converted into cartesian coordinates to realize the transformation. The Translation is done with cartesian coordinates and the rotation is implemented with trigonometric function. After the Transformation, the new cartesian coordinates are converted into ellipsoidal coordinates by an iterative process.

source of EulersTransformation: https://en.wikipedia.org/wiki/Euler_angles

Autor

Yucheng Luo

Bemerkungen

Euler's angle added on 01.02.2018 by Yucheng Luo

Version

0.1

8.7.2 Dokumentation der Elementfunktionen

8.7.2.1 transform()

```
void datumstrategy.EulersTransformation.transform (
            GeographicCoordinateInterface geo )
```

Use Euler angles to transform the geographic coordinate.

Translation : Cartesian coordinates are used. Rotation : rotate with principle of conventional Euler's Standard-x-convention (Rz1,Rx2,Rz3). Algorithm explanation : Rotate first about Z-axis ,after first step rotate about current X-axis, at end rotate about current Z-axis. Link to the Algorithm : https://de.wikipedia.org/wiki/↩Eulersche_Winkel

Autor

Yucheng Luo

Erneute Implementation von datumstrategy.TransformationStrategy.

8.7.3 Dokumentation der Datenelemente

8.7.3.1 e1

```
double datumstrategy.EulersTransformation.e1  [private]
```

8.7.3.2 e2

```
double datumstrategy.EulersTransformation.e2  [private]
```

8.7.3.3 e3

```
double datumstrategy.EulersTransformation.e3  [private]
```

8.7.3.4 e4

```
double datumstrategy.EulersTransformation.e4  [private]
```

8.7.3.5 e5

```
double datumstrategy.EulersTransformation.e5  [private]
```

8.7.3.6 e6

```
double datumstrategy.EulersTransformation.e6  [private]
```

8.7.3.7 e7

```
double datumstrategy.EulersTransformation.e7  [private]
```

8.7.3.8 e8

```
double datumstrategy.EulersTransformation.e8  [private]
```

8.7.3.9 e9

```
double datumstrategy.EulersTransformation.e9  [private]
```

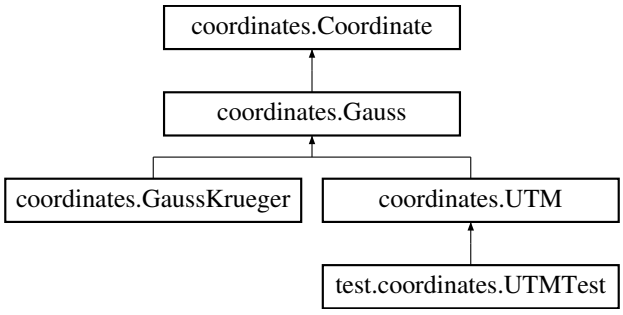
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/EulersTransformation.java

8.8 coordinates.Gauss Klassenreferenz

Class Gauss extends class Coordinate.

Klassendiagramm für coordinates.Gauss:



Öffentliche Methoden

- abstract void print ()

  abstract methnd that allows the concrete Coordinate to be output on screen
- abstract GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ell)

  abstract method that allows the concrete Coordinate instance to be convertable to GeographicCoordinate
- double getAbszisse ()

  getter method that returns the the abscissa of the particular Gauss coordinate
- void setAbszisse (double abszisse)

  setter method that accepts the abscissa of the particular Gauss coordinate
- double getOrdinate ()

  getter method that returns the the ordinate of the particular Gauss coordinate
- void setOrdinate (double ordinate)

  setter method that accepts the ordinate of the particular Gauss coordinate
- double getScale ()

  getter method that returns the the scale of the particular Gauss coordinate
- void setScale (double scale)

  setter method that accepts the scale of the particular Gauss coordinate

- double getHeight ()

  getter method that returns the the height of the particular Gauss coordinate
- void setHeight (double height)

  setter method that accepts the height of the particular Gauss coordinate
- int getEllipsoidal ()

  getter method that returns the the ellipsoidal of the particular Gauss coordinate
- void setEllipsoidal (int ellipsoidal)

  setter method that accepts the ellipsoidal of the particular Gauss coordinate

Öffentliche, statische Methoden

- static double meridianLength (double latitude, EllipsoidParms ell)

Geschützte Methoden

- void CalculateAbszisseOrdinate (double cdl, double hnull, LatParm latparm)

  CalculateAbszisseOrdinate calculates the abscissa and ordinate.

Private Attribute

- double abszisse
- double ordinate
- double scale
- double height
- int ellipsoidal

8.8.1 Ausführliche Beschreibung

Class Gauss extends class Coordinate.

Autor

unknown

Bemerkungen

updated header on 2017-11-29 by Markus Mueller

Version

0.1

Parameter

abszisse	- x-value as double
ordinate	- y-value as double
scale	- scale of central median as double
height	- height as double
ellipsoidal	- height above ellipsoid as integer

8.8.2 Dokumentation der Elementfunktionen

8.8.2.1 CalculateAbszisseOrdinate()

```
void coordinates.Gauss.CalculateAbszisseOrdinate (
            double cdl,
            double hnull,
            LatParm latparm )  [protected]
```

CalculateAbszisseOrdinate calculates the abscissa and ordinate.

Autor

unknown

Bemerkungen

updated header 29.11.2017 by Markus Mueller

Parameter

cdl	- a double
hnull	- a double
latparm	- a LatParm object

8.8.2.2 getAbszisse()

```
double coordinates.Gauss.getAbszisse ( )
```

getter method that returns the the abscissa of the particular Gauss coordinate

Rückgabe

abszisse - returns the abscissa of the particular Gauss coordinate as double

8.8.2.3 getAsGeographicInterface()

```
abstract GeographicCoordinateInterface coordinates.Gauss.getAsGeographicInterface (
            EllipsoidParms ellipsoidParms )  [abstract]
```

abstract method that allows the concrete Coordinate instance to be convertable to GeographicCoordinate

Parameter

ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate should refer to

Erneute Implementation von coordinates.Coordinate.

Erneute Implementation in coordinates.GaussKrueger und coordinates.UTM.

8.8.2.4 getEllipsoidal()

```
int coordinates.Gauss.getEllipsoidal ( )
```

getter method that returns the the ellipsoidal of the particular Gauss coordinate

Rückgabe

ellipsoidal - returns the ellipsoidal of the particular Gauss coordinate as double

8.8.2.5 getHeight()

```
double coordinates.Gauss.getHeight ( )
```

getter method that returns the the height of the particular Gauss coordinate

Rückgabe

height - returns the height of the particular Gauss coordinate as double

8.8.2.6 getOrdinate()

```
double coordinates.Gauss.getOrdinate ( )
```

getter method that returns the the ordinate of the particular Gauss coordinate

Rückgabe

ordinate - returns the ordinate of the particular Gauss coordinate as double

8.8.2.7 getScale()

```
double coordinates.Gauss.getScale ( )
```

getter method that returns the the scale of the particular Gauss coordinate

Rückgabe

scale - returns the ordinate of the particular Gauss coordinate as double as double

8.8.2.8 meridianLength()

```
static double coordinates.Gauss.meridianLength (
            double latitude,
            EllipsoidParms ell )  [static]
```

8.8.2.9 print()

```
abstract void coordinates.Gauss.print ( )  [abstract]
```

abstract methnd that allows the concrete Coordinate to be output on screen

Erneute Implementation von coordinates.Coordinate.

Erneute Implementation in coordinates.GaussKrueger und coordinates.UTM.

8.8.2.10 setAbszisse()

```
void coordinates.Gauss.setAbszisse (
            double abszisse )
```

setter method that accepts the abscissa of the particular Gauss coordinate

Parameter

abszisse	- sets a double representing the abscissa for the particular Gauss coordinate

8.8.2.11 setEllipsoidal()

```
void coordinates.Gauss.setEllipsoidal (
            int ellipsoidal )
```

setter method that accepts the ellipsoidal of the particular Gauss coordinate

Parameter

ellipsoidal	- sets a double representing the ellipsoidal for the particular Gauss coordinate

8.8.2.12 setHeight()

```
void coordinates.Gauss.setHeight (
            double height )
```

setter method that accepts the height of the particular Gauss coordinate

Parameter

height	- sets a double representing the height for the particular Gauss coordinate

8.8.2.13 setOrdinate()

```
void coordinates.Gauss.setOrdinate (
            double ordinate )
```

setter method that accepts the ordinate of the particular Gauss coordinate

Parameter

ordinate	- sets a double representing the ordinate for the particular Gauss coordinate

8.8.2.14 setScale()

```
void coordinates.Gauss.setScale (
            double scale )
```

setter method that accepts the scale of the particular Gauss coordinate

Parameter

scale	- sets a double representing the scale for the particular Gauss coordinate

8.8.3 Dokumentation der Datenelemente

8.8.3.1 abszisse

```
double coordinates.Gauss.abszisse  [private]
```

x-value

8.8.3.2 ellipsoidal

```
int coordinates.Gauss.ellipsoidal  [private]
```

Height above ellipsoid:, 0 => no height, 1 => ellipsoidal, 2 => geoid

8.8.3.3 height

```
double coordinates.Gauss.height  [private]
```

Height

8.8.3.4 ordinate

```
double coordinates.Gauss.ordinate  [private]
```

y-value

8.8.3.5 scale

```
double coordinates.Gauss.scale  [private]
```

scale of central meridian

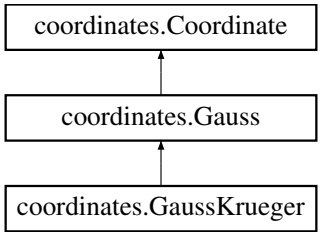
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/Gauss.java

8.9 coordinates.GaussKrueger Klassenreferenz

Coordinate point relating to a certain Gauss-Krueger reference meridian.

Klassendiagramm für coordinates.GaussKrueger:



Öffentliche Methoden

- GaussKrueger ()

  main constructor to set the coordinates and reference meridian
- void print ()

  prints a string representation of the Gauss-Krueger object into the console
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ell)

  transforms the coordinates of the current GaussKrueger instance into geographic coordinates
- void getAsTargetCoordinate (EllipsoidParms ell, GeographicCoordinateInterface geocoord)

  transforms geographic coordinates into GaussKrueger coordinates and stores them in the current GaussKrueger instance
- double getRechts ()

  getter method that returns the the northing of the particular GaussKrueger instance
- void setRechts (double rechts)

  setter method that accepts the easting of the particular GaussKrueger instance
- double getHoch ()

  getter method for the northing of the current GaussKrueger instance
- void setHoch (double hoch)

  setter method that accepts the northing of the particular GaussKrueger instance
- int getIlao ()

  getter method for the reference meridian of the current GaussKrueger instance
- void setIlao (int ilao)

  setter method for the number of the reference meridian of the current GaussKrueger instance

Private Attribute

- double rechts
- double hoch
- int centralMeridian

Weitere Geerbte Elemente

8.9.1 Ausführliche Beschreibung

Coordinate point relating to a certain Gauss-Krueger reference meridian.

Autor

unknown

Bemerkungen

updated header on 2017-11-29 by Markus Mueller

change comment of attribute 'hoch' 2017-12-19 by Markus Hillemann

change attribute name ilao to centralMeridian 2017-12-19 by Markus Hillemann

Version

0.1

Parameter

rechts	- Easting as double
hoch	- Northing as double
centralMeridian	- Central meridian as integer

8.9.2 Beschreibung der Konstruktoren und Destruktoren

8.9.2.1 GaussKrueger()

```
coordinates.GaussKrueger.GaussKrueger ( )
```

main constructor to set the coordinates and reference meridian

8.9.3 Dokumentation der Elementfunktionen

8.9.3.1 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.GaussKrueger.getAsGeographicInterface (
            EllipsoidParms ell )
```

transforms the coordinates of the current GaussKrueger instance into geographic coordinates

Parameter

ell	- an object of type EllipsoidParams that stores information about the reference ellipsoid used for the geographic coordinates

Rückgabe

geographic - returns an object of type GeographicCoordinate that represents the current GaussKrueger instance transformed to geographic coordinates

Erneute Implementation von coordinates.Gauss.

8.9.3.2 getAsTargetCoordinate()

```
void coordinates.GaussKrueger.getAsTargetCoordinate (
            EllipsoidParms ell,
            GeographicCoordinateInterface geocoord )
```

transforms geographic coordinates into GaussKrueger coordinates and stores them in the current GaussKrueger instance

Parameter

ell	- an object of type EllipsoidParams that stores information about the reference ellipsoid used for the geographic coordinates
geocoord	- an object of type GeographicCoordinate that contains the geographic coordinates to be transformed in GaussKrueger coordinates

Erneute Implementation von coordinates.Coordinate.

8.9.3.3 getHoch()

```
double coordinates.GaussKrueger.getHoch ( )
```

getter method for the northing of the current GaussKrueger instance

Rückgabe

hoch - returns the northing of the current GaussKrueger instance as double

8.9.3.4 getIlao()

```
int coordinates.GaussKrueger.getIlao ( )
```

getter method for the reference meridian of the current GaussKrueger instance

Rückgabe

centralMeridian - returns the reference meridian of the current GaussKrueger instance as integer

8.9.3.5 getRechts()

```
double coordinates.GaussKrueger.getRechts ( )
```

getter method that returns the the northing of the particular GaussKrueger instance

Rückgabe

rechts - returns the northing of the particular GaussKrueger instance as double

8.9.3.6 print()

```
void coordinates.GaussKrueger.print ( )
```

prints a string representation of the Gauss-Krueger object into the console

Erneute Implementation von coordinates.Gauss.

8.9.3.7 setHoch()

```
void coordinates.GaussKrueger.setHoch (
            double hoch )
```

setter method that accepts the northing of the particular GaussKrueger instance

Parameter

hoch	- sets a double representing the northing for the particular GaussKrueger instance

8.9.3.8 setIlao()

```
void coordinates.GaussKrueger.setIlao (
            int ilao )
```

setter method for the number of the reference meridian of the current GaussKrueger instance

Parameter

ilao	- sets an integer as the number of the reference meridian of the current GaussKrueger instance

8.9.3.9 setRechts()

```
void coordinates.GaussKrueger.setRechts (
            double rechts )
```

setter method that accepts the easting of the particular GaussKrueger instance

Parameter

rechts	- sets a double representing the easting for the particular GaussKrueger instance

8.9.4 Dokumentation der Datenelemente

8.9.4.1 centralMeridian

```
int coordinates.GaussKrueger.centralMeridian  [private]
```

central meridian

8.9.4.2 hoch

```
double coordinates.GaussKrueger.hoch  [private]
```

'hoch' is the official term used by the German survey admistration ('northing')

8.9.4.3 rechts

```
double coordinates.GaussKrueger.rechts  [private]
```

'rechts' is the official term used by the German survey admistration ('easting')

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/GaussKrueger.java

8.10 test.coordinates.GaussKruegerTest Klassenreferenz

Test class with unit tests to test behavior class GaussKrueger.

Öffentliche Methoden

- void getAsGeographic ()

  tests method getAsGeographic from class GaussKrueger, overwritten from abstract class coordinate expected values and input values are taken from book "Rechenformeln und Rechenbeispiele zur Landesvermessung - Teil 2" from Prof.Dr.-Ing. Albert Schoedlbauer, Robert Wichmann Verlag Karlsruhe, page 88

- void getAsGaussKrueger ()

Private Attribute

- final double RHO = 180/Math.PI
- final double EPSILON_IN_METER = 0.001
- final double EPSILON_IN_DEGREE = 0.00000001

8.10.1 Ausführliche Beschreibung

Test class with unit tests to test behavior class GaussKrueger.

Bemerkungen

last refactored 11.12.2017 by Eva Majer

- adaptions for ControlParms Singleton

8.10.2 Dokumentation der Elementfunktionen

8.10.2.1 getAsGaussKrueger()

```
void test.coordinates.GaussKruegerTest.getAsGaussKrueger ( )
```

8.10.2.2 getAsGeographic()

```
void test.coordinates.GaussKruegerTest.getAsGeographic ( )
```

tests method getAsGeographic from class GaussKrueger, overwritten from abstract class coordinate expected values and input values are taken from book "Rechenformeln und Rechenbeispiele zur Landesvermessung - Teil 2" from Prof.Dr.-Ing. Albert Schoedlbauer, Robert Wichmann Verlag Karlsruhe, page 88

8.10.3 Dokumentation der Datenelemente

8.10.3.1 EPSILON_IN_DEGREE

```
final double test.coordinates.GaussKruegerTest.EPSILON_IN_DEGREE = 0.00000001  [private]
```

8.10.3.2 EPSILON_IN_METER

```
final double test.coordinates.GaussKruegerTest.EPSILON_IN_METER = 0.001  [private]
```

8.10.3.3 RHO

```
final double test.coordinates.GaussKruegerTest.RHO = 180/Math.PI  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/GaussKruegerTest.java

8.11 test.coordinates.GaussTest Klassenreferenz

Test class with unit tests to test behavior class Gauss.

Öffentliche Methoden

- void testMeridianLength ()

Private Attribute

- final double RHO = 180/Math.PI
- final double EPSILON_IN_METER = 0.0004

8.11.1 Ausführliche Beschreibung

Test class with unit tests to test behavior class Gauss.

Bemerkungen

implemented 7.02.2019 by Norbert Rösch

this test should be run before UTMTest and GaussKruegerTest

8.11.2 Dokumentation der Elementfunktionen

8.11.2.1 testMeridianLength()

```
void test.coordinates.GaussTest.testMeridianLength ( )
```

8.11.3 Dokumentation der Datenelemente

8.11.3.1 EPSILON_IN_METER

```
final double test.coordinates.GaussTest.EPSILON_IN_METER = 0.0004  [private]
```

8.11.3.2 RHO

```
final double test.coordinates.GaussTest.RHO = 180/Math.PI  [private]
```

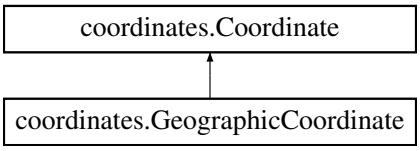
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/GaussTest.java

8.12 coordinates.GeographicCoordinate Klassenreferenz

concrete implementation of abstract class Coordinate, represents a geographic coordinate (as input coordinate)

Klassendiagramm für coordinates.GeographicCoordinate:



Öffentliche Methoden

- GeographicCoordinate ()
- GeographicCoordinate (double longitude, double latitude)
- GeographicCoordinate (double longitude, double latitude, double height)
- void print ()

  prints a string representation of the particular GeographicCoordinate instance into the console
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ellipsoidParms)

  allows the particular GeographicCoordinate instance to be converted to GeographicCoordinate. Assigns all parameters of GeographicCoordinateInterface the values of the parameters of this object.
- void getAsTargetCoordinate (EllipsoidParms ellipsoidParms, GeographicCoordinateInterface geoCoordInt)

  allows the the particular GeographicCoordinate instance to be converted from GeographicCoordinate. Assigns all values of the parameters of this object the parameters of this object.
- long getPoint_number ()

  getter method that returns point number of the particular Geographic Coordinate point
- void setPoint_number (long point_number)

  setter method that accepts point number for the particular Geographic Coordinate point
- double getLongitude ()

  getter method that returns the geographical longitude
- void setLongitude (double longitude)

  setter method that accepts the geographical longitude
- double getLatitude ()

  getter method that returns the geographical latitude
- void setLatitude (double latitude)

  setter method that accepts the geographical latitude
- double getHeight ()

  getter method that returns the height
- void setHeight (double height)

  setter method accepts the height
- int getEllipsoidal ()

  getter method that returns the height above ellipsoid
- void setEllipsoidal (int ellipsoidal)

  setter method accepts the height above ellipsoid

Öffentliche, statische Methoden

- static GeographicCoordinate getInstance (double longitude, double latitude)

  factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude and latitude
- static GeographicCoordinate getInstance (double longitude, double latitude, double height)

  factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude, latitude and height

Private Methoden

- void resetState ()

  sets all parameters of the instance to default value 0, needed because only one instance of the class can exist (singleton class)

Private Attribute

- long point_number
- double longitude
- double latitude
- double height
- int ellipsoidal

Statische, private Attribute

- static GeographicCoordinate myInstance = null

8.12.1 Ausführliche Beschreibung

concrete implementation of abstract class Coordinate, represents a geographic coordinate (as input coordinate)

Autor

unknown as of 2016-11

Bemerkungen

Split former class GeographicCoordinate into GeographicCoordinate (only input coordinate) and GeographicCoordinateInterface (Interface for strategy) on 2018-01-12 by Johanna Stoetzer

updated header on 2017-11-29 by Markus Mueller

renamed to GeographicCoordinate (was GeographicCoordinates) on 2016-11-26 by Patrick Huebner

Version

0.1

Parameter

point	number - Point identification number of the GeographicCoordinate as long
longitude	- Longitude of the GeographicCoordinate as double
latitude	- Latitude of the GeographicCoordinate as double
height	- Height of the GeographicCoordinate as double
ellipsoidal	- Height above ellipsoid of the GeographicCoordinate as integer

8.12.2 Beschreibung der Konstruktoren und Destruktoren

8.12.2.1 GeographicCoordinate() [1/3]

```
coordinates.GeographicCoordinate.GeographicCoordinate ( )
```

8.12.2.2 GeographicCoordinate() [2/3]

```
coordinates.GeographicCoordinate.GeographicCoordinate (
            double longitude,
            double latitude )
```

8.12.2.3 GeographicCoordinate() [3/3]

```
coordinates.GeographicCoordinate.GeographicCoordinate (
            double longitude,
            double latitude,
            double height )
```

8.12.3 Dokumentation der Elementfunktionen

8.12.3.1 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.GeographicCoordinate.getAsGeographicInterface (
            EllipsoidParms ellipsoidParms )
```

allows the particular GeographicCoordinate instance to be converted to GeographicCoordinate. Assigns all parameters of GeographicCoordinateInterface the values of the parameters of this object.

Parameter

ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate should refer to

Erneute Implementation von coordinates.Coordinate.

8.12.3.2 getAsTargetCoordinate()

```
void coordinates.GeographicCoordinate.getAsTargetCoordinate (
            EllipsoidParms ellipsoidParms,
            GeographicCoordinateInterface geoCoordInt )
```

allows the the particular GeographicCoordinate instance to be converted from GeographicCoordinate. Assigns all values of the parameters of this object the parameters of this object.

Parameter

geoCoordInt	- an object of type GeographicCoordinate that represents the geographic coordinate the concrete Coordinate instance should be converted from
ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate refers to

Erneute Implementation von coordinates.Coordinate.

8.12.3.3 getEllipsoidal()

```
int coordinates.GeographicCoordinate.getEllipsoidal ( )
```

getter method that returns the height above ellipsoid

Rückgabe

ellipsoidal - returns a double value representing the height above ellipsoid

8.12.3.4 getHeight()

```
double coordinates.GeographicCoordinate.getHeight ( )
```

getter method that returns the height

Rückgabe

height - returns a double value representing the height

8.12.3.5 getInstance() [1/2]

```
static GeographicCoordinate coordinates.GeographicCoordinate.getInstance (
            double longitude,
            double latitude )  [static]
```

factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude and latitude

Parameter

longitude	- double value of the geographical longitude the GeographicCoordinate instance should be initialized with
latitude	- double value of the geographical latitude the GeographicCoordinate instance should be initialized with

8.12.3.6 getInstance() [2/2]

```
static GeographicCoordinate coordinates.GeographicCoordinate.getInstance (
            double longitude,
            double latitude,
            double height )  [static]
```

factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude, latitude and height

Parameter

longitude	- double value of the geographical longitude the GeographicCoordinate instance should be initialized with
latitude	- double value of the geographical latitude the GeographicCoordinate instance should be initialized with
height	- double value of the height the GeographicCoordinate instance should be initialized with

8.12.3.7 getLatitude()

```
double coordinates.GeographicCoordinate.getLatitude ( )
```

getter method that returns the geographical latitude

Rückgabe

latitude - returns a double value representing the geographical latitude

8.12.3.8 getLongitude()

```
double coordinates.GeographicCoordinate.getLongitude ( )
```

getter method that returns the geographical longitude

Rückgabe

longitude - returns a double value representing the geographical longitude

8.12.3.9 getPoint_number()

```
long coordinates.GeographicCoordinate.getPoint_number ( )
```

getter method that returns point number of the particular Geographic Coordinate point

Rückgabe

point_number - returns the point number of the particular Geographic Coordinate point as long value

8.12.3.10 print()

```
void coordinates.GeographicCoordinate.print ( )
```

prints a string representation of the particular GeographicCoordinate instance into the console

Erneute Implementation von coordinates.Coordinate.

8.12.3.11 resetState()

```
void coordinates.GeographicCoordinate.resetState ( )  [private]
```

sets all parameters of the instance to default value 0, needed because only one instance of the class can exist (singleton class)

8.12.3.12 setEllipsoidal()

```
void coordinates.GeographicCoordinate.setEllipsoidal (
            int ellipsoidal )
```

setter method accepts the height above ellipsoid

Parameter

ellipsoidal	- double value representing the height above ellipsoid

8.12.3.13 setHeight()

```
void coordinates.GeographicCoordinate.setHeight (
            double height )
```

setter method accepts the height

Parameter

height	- double value representing the height

8.12.3.14 setLatitude()

```
void coordinates.GeographicCoordinate.setLatitude (
            double latitude )
```

setter method that accepts the geographical latitude

Parameter

latitude	- double value representing the geographical latitude

8.12.3.15 setLongitude()

```
void coordinates.GeographicCoordinate.setLongitude (
            double longitude )
```

setter method that accepts the geographical longitude

Parameter

longitude	- double value representing the geographical longitude

8.12.3.16 setPoint_number()

```
void coordinates.GeographicCoordinate.setPoint_number (
            long point_number )
```

setter method that accepts point number for the particular Geographic Coordinate point

Parameter

point_number	- a long value representing the point number for the particular Geographic Coordinate point

8.12.4 Dokumentation der Datenelemente

8.12.4.1 ellipsoidal

```
int coordinates.GeographicCoordinate.ellipsoidal  [private]
```

Height above ellipsoid: 0 => no height (not defined), 1 => ellipsoidal, 2 => geoid

8.12.4.2 height

```
double coordinates.GeographicCoordinate.height  [private]
```

8.12.4.3 latitude

```
double coordinates.GeographicCoordinate.latitude  [private]
```

8.12.4.4 longitude

```
double coordinates.GeographicCoordinate.longitude  [private]
```

8.12.4.5 myInstance

```
GeographicCoordinate coordinates.GeographicCoordinate.myInstance = null  [static], [private]
```

8.12.4.6 point_number

```
long coordinates.GeographicCoordinate.point_number  [private]
```

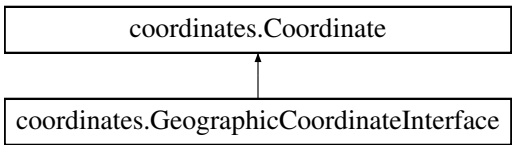
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/GeographicCoordinate.java

8.13 coordinates.GeographicCoordinateInterface Klassenreferenz

concrete implementation of abstract class Coordinate, represents a geographic coordinate (As interface for strategy)

Klassendiagramm für coordinates.GeographicCoordinateInterface:



Öffentliche Methoden

- GeographicCoordinateInterface ()
- GeographicCoordinateInterface (double longitude, double latitude)
- void print ()

  prints a string representation of the particular GeographicCoordinate instance into the console
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ellipsoidParms)

  allows the particular GeographicCoordinate instance to be converted to GeographicCoordinate. simply returns this reference
- void getAsTargetCoordinate (EllipsoidParms ellipsoidParms, GeographicCoordinateInterface geographic↩ Coordinate)

  allows the the particular GeographicCoordinate instance to be converted from GeographicCoordinate. simply uses copy method
- GeographicCoordinateInterface molodenskytrafo (EllipsoidParms ell, MolodenskyParm trafoparameter)

  calculates a Molodensky transformation
- double fupubre (double s, EllipsoidParms ell)

  calculates pulse width (Fusspunktbreite) for a given range
- void GeographicLongitudeLatitude (double xg, double yg, EllipsoidParms ell, double scale, double l0)

  sets longitude and latitude according to given parameters
- void copy (GeographicCoordinateInterface geo)

  works like a copy constructor, initializes particular instance with the values of the instance passed as parameter
- long getPoint_number ()

  getter method that returns point number of the particular Geographic Coordinate point
- void setPoint_number (long point_number)

  setter method that accepts point number for the particular Geographic Coordinate point
- double getLongitude ()

  getter method that returns the geographical longitude
- void setLongitude (double longitude)

setter method that accepts the geographical longitude

- double getLatitude ()

  getter method that returns the geographical latitude

- void setLatitude (double latitude)

  setter method that accepts the geographical latitude

- double getHeight ()

  getter method that returns the height

- void setHeight (double height)

  setter method accepts the height

- int getEllipsoidal ()

  getter method that returns the height above ellipsoid

- void setEllipsoidal (int ellipsoidal)

  setter method accepts the height above ellipsoid

Öffentliche, statische Methoden

- static GeographicCoordinateInterface getInstance ()

  factory method that returns the singular instance of the singleton class initialized with default constructor

- static GeographicCoordinateInterface getInstance (double longitude, double latitude)

  factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude and latitude

- static GeographicCoordinateInterface getInstance (double longitude, double latitude, double height)

  factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude, latitude and height

Private Methoden

- GeographicCoordinateInterface (double longitude, double latitude, double height)
- void resetState ()

  sets all parameters of the instance to default value 0, needed because only one instance of the class can exist (singleton class)

Private Attribute

- long point_number
- double longitude
- double latitude
- double height
- int ellipsoidal

Statische, private Attribute

- static GeographicCoordinateInterface myInstance = null

8.13.1 Ausführliche Beschreibung

concrete implementation of abstract class Coordinate, represents a geographic coordinate (As interface for strategy)

Autor

unknown as of 2016-11

Bemerkungen

renamed to GeographicCoordinateInterface. Class is now separated into GeographicCoordinate (only input coordinate) and GeographicCoordinateInterface (Interface for strategy) on 2018-01-12 by Johanna Stoetzer

updated header on 2017-11-29 by Markus Mueller

renamed to GeographicCoordinate (was GeographicCoordinates) on 2016-11-26 by Patrick Huebner

Version

0.1

Parameter

point	number - Point identification number of the GeographicCoordinate as long
longitude	- Longitude of the GeographicCoordinate as double
latitude	- Latitude of the GeographicCoordinate as double
height	- Height of the GeographicCoordinate as double
ellipsoidal	- Height above ellipsoid of the GeographicCoordinate as integer

8.13.2 Beschreibung der Konstruktoren und Destruktoren

8.13.2.1 GeographicCoordinateInterface() [1/3]

```
coordinates.GeographicCoordinateInterface.GeographicCoordinateInterface ( )
```

Bemerkungen

public/visible due to testing

Parameter

longitude	
latitude	

8.13.2.2 GeographicCoordinateInterface() [2/3]

```
coordinates.GeographicCoordinateInterface.GeographicCoordinateInterface (
            double longitude,
            double latitude )
```

8.13.2.3 GeographicCoordinateInterface() [3/3]

```
coordinates.GeographicCoordinateInterface.GeographicCoordinateInterface (
            double longitude,
            double latitude,
            double height )  [private]
```

8.13.3 Dokumentation der Elementfunktionen

8.13.3.1 copy()

```
void coordinates.GeographicCoordinateInterface.copy (
            GeographicCoordinateInterface geo )
```

works like a copy constructor, initializes particular instance with the values of the instance passed as parameter

Parameter

geo	- the GeographicCoordinate to initialize the particular instance with

8.13.3.2 fupubre()

```
double coordinates.GeographicCoordinateInterface.fupubre (
            double s,
            EllipsoidParms ell )
```

calculates pulse width (Fusspunktbreite) for a given range

Parameter

s	- double value for the range
ell	- an object of type EllipsoidParms that contains details about the ellipsoid the pulse width calculation refers to

Rückgabe

br - returns the pulse width (Fusspunktbreite) as double value

8.13.3.3 GeographicLongitudeLatitude()

```
void coordinates.GeographicCoordinateInterface.GeographicLongitudeLatitude (
            double xg,
            double yg,
            EllipsoidParms ell,
            double scale,
            double l0 )
```

sets longitude and latitude according to given parameters

Parameter

xg	- double value representing geographic decimal coordinate?
yg	- double value representing geographic decimal coordinate?
ell	- an object of type EllipsoidParms that contains details about the ellipsoid
scale	- scale as double value
l0	- ??

8.13.3.4 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.getAsGeographic↩
Interface (
            EllipsoidParms ellipsoidParms )
```

allows the particular GeographicCoordinate instance to be converted to GeographicCoordinate. simply returns this reference

Parameter

ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate should refer to

Erneute Implementation von coordinates.Coordinate.

8.13.3.5 getAsTargetCoordinate()

```
void coordinates.GeographicCoordinateInterface.getAsTargetCoordinate (
            EllipsoidParms ellipsoidParms,
            GeographicCoordinateInterface geographicCoordinate )
```

allows the the particular GeographicCoordinate instance to be converted from GeographicCoordinate. simply uses copy method

Parameter

geographicCoordinate	- an object of type GeographicCoordinate that represents the geographic coordinate the concrete Coordinate instance should be converted from
ellipsoidParms	- an object of type EllipsoidParms that contains details about the ellipsoid the GeographicCoordinate refers to

Erneute Implementation von coordinates.Coordinate.

8.13.3.6 getEllipsoidal()

```
int coordinates.GeographicCoordinateInterface.getEllipsoidal ( )
```

getter method that returns the height above ellipsoid

Rückgabe

ellipsoidal - returns a double value representing the height above ellipsoid

8.13.3.7 getHeight()

```
double coordinates.GeographicCoordinateInterface.getHeight ( )
```

getter method that returns the height

Rückgabe

height - returns a double value representing the height

8.13.3.8 getInstance() [1/3]

```
static GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.getInstance ( )
[static]
```

factory method that returns the singular instance of the singleton class initialized with default constructor

8.13.3.9 getInstance() [2/3]

```
static GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.getInstance (
            double longitude,
            double latitude )  [static]
```

factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude and latitude

Parameter

longitude	- double value of the geographical longitude the GeographicCoordinate instance should be initialized with
latitude	- double value of the geographical latitude the GeographicCoordinate instance should be initialized with

8.13.3.10 getInstance() [3/3]

```
static GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.getInstance (
            double longitude,
            double latitude,
            double height )  [static]
```

factory method that returns the singular instance of the singleton class initialized with constructor that accepts values for longitude, latitude and height

Parameter

longitude	- double value of the geographical longitude the GeographicCoordinate instance should be initialized with
latitude	- double value of the geographical latitude the GeographicCoordinate instance should be initialized with
height	- double value of the height the GeographicCoordinate instance should be initialized with

8.13.3.11 getLatitude()

```
double coordinates.GeographicCoordinateInterface.getLatitude ( )
```

getter method that returns the geographical latitude

Rückgabe

latitude - returns a double value representing the geographical latitude

8.13.3.12 getLongitude()

```
double coordinates.GeographicCoordinateInterface.getLongitude ( )
```

getter method that returns the geographical longitude

Rückgabe

longitude - returns a double value representing the geographical longitude

8.13.3.13 getPoint_number()

```
long coordinates.GeographicCoordinateInterface.getPoint_number ( )
```

getter method that returns point number of the particular Geographic Coordinate point

Rückgabe

point_number - returns the point number of the particular Geographic Coordinate point as long value

8.13.3.14 molodenskytrafo()

```
GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.molodenskytrafo (
            EllipsoidParms ell,
            MolodenskyParm trafoparameter )
```

calculates a Molodensky transformation

Parameter

ell	- an object of type EllipsoidParms that contains details about the ellipsoid the transformation refers to
trafoparameter	- an object of type MolodenskyParm that contains the parameters of the Molodenskij transformation

Rückgabe

geo_p2 - returns a transformed geographic coordinate

8.13.3.15 print()

```
void coordinates.GeographicCoordinateInterface.print ( )
```

prints a string representation of the particular GeographicCoordinate instance into the console

Erneute Implementation von coordinates.Coordinate.

8.13.3.16 resetState()

```
void coordinates.GeographicCoordinateInterface.resetState ( )  [private]
```

sets all parameters of the instance to default value 0, needed because only one instance of the class can exist (singleton class)

8.13.3.17 setEllipsoidal()

```
void coordinates.GeographicCoordinateInterface.setEllipsoidal (
            int ellipsoidal )
```

setter method accepts the height above ellipsoid

Parameter

ellipsoidal	- double value representing the height above ellipsoid

8.13.3.18 setHeight()

```
void coordinates.GeographicCoordinateInterface.setHeight (
            double height )
```

setter method accepts the height

Parameter

height	- double value representing the height

8.13.3.19 setLatitude()

```
void coordinates.GeographicCoordinateInterface.setLatitude (
            double latitude )
```

setter method that accepts the geographical latitude

Parameter

latitude	- double value representing the geographical latitude

8.13.3.20 setLongitude()

```
void coordinates.GeographicCoordinateInterface.setLongitude (
            double longitude )
```

setter method that accepts the geographical longitude

Parameter

longitude	- double value representing the geographical longitude

8.13.3.21 setPoint_number()

```
void coordinates.GeographicCoordinateInterface.setPoint_number (
            long point_number )
```

setter method that accepts point number for the particular Geographic Coordinate point

Parameter

point_number	- a long value representing the point number for the particular Geographic Coordinate point

8.13.4 Dokumentation der Datenelemente

8.13.4.1 ellipsoidal

```
int coordinates.GeographicCoordinateInterface.ellipsoidal  [private]
```

Height above ellipsoid: 0 => no height (not defined), 1 => ellipsoidal, 2 => geoid

8.13.4.2 height

```
double coordinates.GeographicCoordinateInterface.height  [private]
```

8.13.4.3 latitude

```
double coordinates.GeographicCoordinateInterface.latitude  [private]
```

8.13.4.4 longitude

```
double coordinates.GeographicCoordinateInterface.longitude  [private]
```

8.13.4.5 myInstance

```
GeographicCoordinateInterface coordinates.GeographicCoordinateInterface.myInstance = null
[static], [private]
```

8.13.4.6 point_number

```
long coordinates.GeographicCoordinateInterface.point_number  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/GeographicCoordinateInterface.java

8.14 test.coordinates.GeographicCoordinateTest Klassenreferenz

Öffentliche Methoden

- void testGetAsGeographicInterface ()
- void testFromGeographicInterface ()

Statische, private Attribute

- static final double EPSILONFORDEGREE = 5.e-10

8.14.1 Dokumentation der Elementfunktionen

8.14.1.1 testFromGeographicInterface()

```
void test.coordinates.GeographicCoordinateTest.testFromGeographicInterface ( )
```

8.14.1.2 testGetAsGeographicInterface()

```
void test.coordinates.GeographicCoordinateTest.testGetAsGeographicInterface ( )
```

8.14.2 Dokumentation der Datenelemente

8.14.2.1 EPSILONFORDEGREE

```
final double test.coordinates.GeographicCoordinateTest.EPSILONFORDEGREE = 5.e-10  [static],
[private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/GeographicCoordinateTest.java

8.15 coordinates.GetAppropriateCoordinate Klassenreferenz

Coordinate factory for plane coordinates and geographic coordinates.

Öffentliche, statische Methoden

- static Coordinate getCoord (String object)
  getter method that returns an appropriate coordinate depending on the users input
- static GeographicCoordinateInterface getGeographicCoordinateInterface ()

8.15.1 Ausführliche Beschreibung

Coordinate factory for plane coordinates and geographic coordinates.

Autor

Norbert Rösch

Bemerkungen

updated header on 2017-11-29 by Markus Mueller
last refactored 11.12.2017 by Eva Majer

- adaptions for ControlParms Singleton
- Translation of some comments

2018-01-06 add comments by Yunhao Huang
2018-01-12 added new GeographicCoordinate as comment by Johanna Stoetzer
2018-01-25 added XYZ-Coordinate to getCoord by Markus Mueller

Version

0.1

Parameter

Coordinate	- the plane coordinates GaussKrueger, UTM and Soldner
GeographicCoordinateInterface	- the geographic coordinate interface

8.15.2 Dokumentation der Elementfunktionen

8.15.2.1 getCoord()

```
static Coordinate coordinates.GetAppropriateCoordinate.getCoord (
            String object )  [static]
```

getter method that returns an appropriate coordinate depending on the users input

Parameter

object	- string representing the type of the coordinate

8.15.2.2 getGeographicCoordinateInterface()

```
static GeographicCoordinateInterface coordinates.GetAppropriateCoordinate.getGeographic↩
CoordinateInterface ( )  [static]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/GetAppropriateCoordinate.java

8.16 datumstrategy.GetAppropriateTransformationAlgorithm Klassenreferenz

Öffentliche, statische Methoden

- static TransformationStrategy getStrategy ()

8.16.1 Ausführliche Beschreibung

Bemerkungen

- adaptions for ControlParms Singleton

8.16.2 Dokumentation der Elementfunktionen

8.16.2.1 getStrategy()

```
static TransformationStrategy datumstrategy.GetAppropriateTransformationAlgorithm.getStrategy
( )  [static]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/GetAppropriateTransformationAlgorithm.java

8.17 test.datumstrategy.GetAppropriateTransformationAlgorithmTest Klassenreferenz

Öffentliche Methoden

- void testSpatialSimilarityTransformationInfin ()

8.17.1 Dokumentation der Elementfunktionen

8.17.1.1 testSpatialSimilarityTransformationInfin()

```
void test.datumstrategy.GetAppropriateTransformationAlgorithmTest.testSpatialSimilarity↩
TransformationInfin ( )
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/GetAppropriateTransformationAlgorithmTest.java

8.18 params.LatParm Klassenreferenz

Latitude Parameters.

Öffentliche Methoden

- LatParm ()
- void Constant (EllipsoidParms ell, double latitude)
- double getRadm ()
- void setRadm (double radm)
- double getRadn ()
- void setRadn (double radn)
- double getRadg ()
- void setRadg (double radg)
- double getTbr ()
- void setTbr (double tbr)
- double getVbr ()
- void setVbr (double vbr)
- double getEtabr ()
- void setEtabr (double etabr)
- double getCbr ()
- void setCbr (double cbr)
- double getVbr2 ()
- void setVbr2 (double vbr2)
- double getTbr2 ()
- void setTbr2 (double tbr2)

Private Attribute

- double radm
- double radn
- double radg
- double tbr
- double vbr
- double etabr
- double cbr

8.18.1 Ausführliche Beschreibung

Latitude Parameters.

Autor

unknown

Bemerkungen

add header on 2018-01-06 by Yunhao Huang

8.18.2 Beschreibung der Konstruktoren und Destruktoren

8.18.2.1 LatParm()

```
params.LatParm.LatParm ( )
```

8.18.3 Dokumentation der Elementfunktionen

8.18.3.1 Constant()

```
void params.LatParm.Constant (
            EllipsoidParms ell,
            double latitude )
```

8.18.3.2 getCbr()

```
double params.LatParm.getCbr ( )
```

8.18.3.3 getEtabr()

```
double params.LatParm.getEtabr ( )
```

8.18.3.4 getRadg()

```
double params.LatParm.getRadg ( )
```

8.18.3.5 getRadm()

```
double params.LatParm.getRadm ( )
```

8.18.3.6 getRadn()

```
double params.LatParm.getRadn ( )
```

8.18.3.7 getTbr()

```
double params.LatParm.getTbr ( )
```

8.18.3.8 getTbr2()

```
double params.LatParm.getTbr2 ( )
```

8.18.3.9 getVbr()

```
double params.LatParm.getVbr ( )
```

8.18.3.10 getVbr2()

```
double params.LatParm.getVbr2 ( )
```

8.18.3.11 setCbr()

```
void params.LatParm.setCbr (
            double cbr )
```

8.18.3.12 setEtabr()

```
void params.LatParm.setEtabr (
            double etabr )
```

8.18.3.13 setRadg()

```
void params.LatParm.setRadg (
            double radg )
```

8.18.3.14 setRadm()

```
void params.LatParm.setRadm (
            double radm )
```

8.18.3.15 setRadn()

```
void params.LatParm.setRadn (
            double radn )
```

8.18.3.16 setTbr()

```
void params.LatParm.setTbr (
            double tbr )
```

8.18.3.17 setTbr2()

```
void params.LatParm.setTbr2 (
            double tbr2 )
```

8.18.3.18 setVbr()

```
void params.LatParm.setVbr (
            double vbr )
```

8.18.3.19 setVbr2()

```
void params.LatParm.setVbr2 (
            double vbr2 )
```

8.18.4 Dokumentation der Datenelemente

8.18.4.1 cbr

```
double params.LatParm.cbr  [private]
```

8.18.4.2 etabr

```
double params.LatParm.etabr  [private]
```

auxiliary value eta2 for the latitude BR

8.18.4.3 radg

```
double params.LatParm.radg  [private]
```

coordinates. Gaussian curvature radius G

8.18.4.4 radm

```
double params.LatParm.radm  [private]
```

radius of meridian curvature M

8.18.4.5 radn

```
double params.LatParm.radn  [private]
```

radius of transverse curvature N

8.18.4.6 tbr

```
double params.LatParm.tbr  [private]
```

Tangent of latitude

8.18.4.7 vbr

```
double params.LatParm.vbr  [private]
```

auxiliary value V for the latitude BR

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- params/LatParm.java

8.19 test.params.LatParmTest Klassenreferenz

Öffentliche Methoden

- void test ()

8.19.1 Dokumentation der Elementfunktionen

8.19.1.1 test()

```
void test.params.LatParmTest.test ( )
```

Test based on parameters of GRS 80

Autor

N. Roesch

Datum

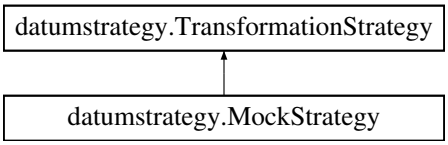
18.01.2017

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/params/LatParmTest.java

8.20 datumstrategy.MockStrategy Klassenreferenz

Klassendiagramm für datumstrategy.MockStrategy:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geographicCoordinate)
  abstract method for the transformation of a geographic coordinate

8.20.1 Dokumentation der Elementfunktionen

8.20.1.1 transform()

```
void datumstrategy.MockStrategy.transform (
            GeographicCoordinateInterface geographicCoordinate )
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation von datumstrategy.TransformationStrategy.

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/MockStrategy.java

8.21 test.datumstrategy.MockStrategyTest Klassenreferenz

Test class with two integration tests to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip and vice versa. The datumstrategy "MockStrategy" is used.

Öffentliche Methoden

- void testTransformGaussKruegerStrip3ToStrip4 ()

  Test method "testTransformGaussKruegerStrip3ToStrip4" to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip without changing the geodetic datum (DHDN).
- void testTransformGaussKruegerStrip4ToStrip3 ()

  Test method "testTransformGaussKruegerStrip4ToStrip3" to test the transition of a Gauss-Krueger-coordinate from the fourth to the third strip without changing the geodetic datum (DHDN).

Private Attribute

- final double EPSILON_IN_METER = 0.001

8.21.1 Ausführliche Beschreibung

Test class with two integration tests to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip and vice versa. The datumstrategy "MockStrategy" is used.

Autor

Jessica Palka

Datum

December 2019

8.21.2 Dokumentation der Elementfunktionen

8.21.2.1 testTransformGaussKruegerStrip3ToStrip4()

```
void test.datumstrategy.MockStrategyTest.testTransformGaussKruegerStrip3ToStrip4 ( )
```

Test method "testTransformGaussKruegerStrip3ToStrip4" to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip without changing the geodetic datum (DHDN).

Bemerkungen

Expected values and input values for this test are taken from Prof.Dr.-Ing. Albert Schoedlbauer, "↩ Rechenformeln und Rechenbeispiele zur Landesvermessung - Teil 2", Robert Wichmann Verlag Karlsruhe, page 153

8.21.2.2 testTransformGaussKruegerStrip4ToStrip3()

```
void test.datumstrategy.MockStrategyTest.testTransformGaussKruegerStrip4ToStrip3 ( )
```

Test method "testTransformGaussKruegerStrip4ToStrip3" to test the transition of a Gauss-Krueger-coordinate from the fourth to the third strip without changing the geodetic datum (DHDN).

Bemerkungen

Expected values and input values for this test are taken from Prof.Dr.-Ing. Albert Schoedlbauer, "↩ Rechenformeln und Rechenbeispiele zur Landesvermessung - Teil 2", Robert Wichmann Verlag Karlsruhe, page 154

8.21.3 Dokumentation der Datenelemente

8.21.3.1 EPSILON_IN_METER

```
final double test.datumstrategy.MockStrategyTest.EPSILON_IN_METER = 0.001  [private]
```

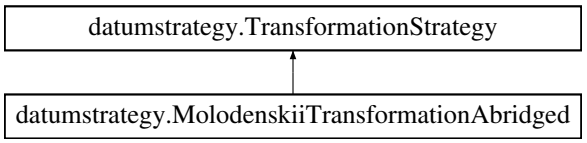
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/MockStrategyTest.java

8.22 datumstrategy.MolodenskiiTransformationAbridged Klassenreferenz

Algorithmic realization of the abridged molodensky transformation.

Klassendiagramm für datumstrategy.MolodenskiiTransformationAbridged:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)

  abstract method for the transformation of a geographic coordinate

Öffentliche, statische Methoden

- static MolodenskiiTransformationAbridged getInstance ()

Private Methoden

- MolodenskiiTransformationAbridged ()

Statische, private Attribute

- static MolodenskiiTransformationAbridged myInstance = null

8.22.1 Ausführliche Beschreibung

Algorithmic realization of the abridged molodensky transformation.

Autor

Svea Krikau

Bemerkungen

created 7. December 2019

Version

0.1 Quelle: http://www.mygeodesy.id.au/documents/Molodensky%20V2.pdf

8.22.2 Beschreibung der Konstruktoren und Destruktoren

8.22.2.1 MolodenskiiTransformationAbridged()

```
datumstrategy.MolodenskiiTransformationAbridged.MolodenskiiTransformationAbridged ( )  [private]
```

8.22.3 Dokumentation der Elementfunktionen

8.22.3.1 getInstance()

```
static MolodenskiiTransformationAbridged datumstrategy.MolodenskiiTransformationAbridged.get↩
Instance ( )  [static]
```

8.22.3.2 transform()

```
void datumstrategy.MolodenskiiTransformationAbridged.transform (
            GeographicCoordinateInterface geographicCoordinate )
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation von datumstrategy.TransformationStrategy.

8.22.4 Dokumentation der Datenelemente

8.22.4.1 myInstance

```
MolodenskiiTransformationAbridged datumstrategy.MolodenskiiTransformationAbridged.myInstance =
null  [static], [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/MolodenskiiTransformationAbridged.java

8.23 test.datumstrategy.MolodenskiiTransformationAbridgedTest Klassenreferenz

Test of the algorithmic realization of the abridged molodensky transformation.

Öffentliche Methoden

- void testMolodenskiiTransformationAbridged ()

Private Attribute

- final double RHO = 180 / Math.PI
- final double EPSILON_meter = 0.0001
- final double EPSILON_rad = 0.000000001

8.23.1 Ausführliche Beschreibung

Test of the algorithmic realization of the abridged molodensky transformation.

Autor

Svea Krikau

Bemerkungen

created 7. December 2019

Version

0.1 Quelle: http://www.mygeodesy.id.au/documents/Molodensky%20V2.pdf

8.23.2 Dokumentation der Elementfunktionen

8.23.2.1 testMolodenskiiTransformationAbridged()

```
void test.datumstrategy.MolodenskiiTransformationAbridgedTest.testMolodenskiiTransformation↩
Abridged ( )
```

Test of the abridged Molodenskii Transformation. Transformation from the Australian Geodetic Datum 1966 (AGD66) to the World Geodetic System 1984 (WGS84) Source: http://www.mygeodesy.id.au/documents/↩ Molodensky%20V2.pdf

8.23.3 Dokumentation der Datenelemente

8.23.3.1 EPSILON_meter

```
final double test.datumstrategy.MolodenskiiTransformationAbridgedTest.EPSILON_meter = 0.0001
[private]
```

8.23.3.2 EPSILON_rad

```
final double test.datumstrategy.MolodenskiiTransformationAbridgedTest.EPSILON_rad = 0.000000001
[private]
```

8.23.3.3 RHO

```
final double test.datumstrategy.MolodenskiiTransformationAbridgedTest.RHO = 180 / Math.PI
[private]
```

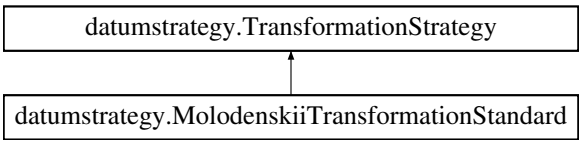
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/MolodenskiiTransformationAbridgedTest.java

8.24 datumstrategy.MolodenskiiTransformationStandard Klassenreferenz

Algorithmic realization of the molodensky transformation.

Klassendiagramm für datumstrategy.MolodenskiiTransformationStandard:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)
  abstract method for the transformation of a geographic coordinate

Öffentliche, statische Methoden

- static MolodenskiiTransformationStandard getInstance ()

Private Methoden

- MolodenskiiTransformationStandard ()

Statische, private Attribute

- static MolodenskiiTransformationStandard myInstance = null

8.24.1 Ausführliche Beschreibung

Algorithmic realization of the molodensky transformation.

Autor

unknown

Bemerkungen

last refactored 11.12.2017 by Eva Majer

- adaptions for ControlParms Singleton
- Translation of some comments
- removed declaration of dl hd db which appeared 3 times

changed the class name (CamelCase) on 20.12.17 by Markus Hillemann

Version

0.1

8.24.2 Beschreibung der Konstruktoren und Destruktoren

8.24.2.1 MolodenskiiTransformationStandard()

```
datumstrategy.MolodenskiiTransformationStandard.MolodenskiiTransformationStandard ( )  [private]
```

8.24.3 Dokumentation der Elementfunktionen

8.24.3.1 getInstance()

```
static MolodenskiiTransformationStandard datumstrategy.MolodenskiiTransformationStandard.get↩
Instance ( )  [static]
```

8.24.3.2 transform()

```
void datumstrategy.MolodenskiiTransformationStandard.transform (
            GeographicCoordinateInterface geographicCoordinate )
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation von datumstrategy.TransformationStrategy.

8.24.4 Dokumentation der Datenelemente

8.24.4.1 myInstance

```
MolodenskiiTransformationStandard datumstrategy.MolodenskiiTransformationStandard.myInstance =
null  [static], [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/MolodenskiiTransformationStandard.java

8.25 test.datumstrategy.MolodenskiiTransformationStandardTest Klassenreferenz

Tests the Molodenskii Transformation Standard as a Datum Strategy. Input values and expected values were calculated by hand.

Öffentliche Methoden

- void testTransform ()

Private Attribute

- final double RHO = 180/Math.PI
- final double EPSILON_IN_METER = 0.001
- final double EPSILON_IN_RAD = 0.00000001

8.25.1 Ausführliche Beschreibung

Tests the Molodenskii Transformation Standard as a Datum Strategy. Input values and expected values were calculated by hand.

Autor

Steven Landgraf

Datum

December 2019

Version

0.1

8.25.2 Dokumentation der Elementfunktionen

8.25.2.1 testTransform()

```
void test.datumstrategy.MolodenskiiTransformationStandardTest.testTransform ( )
```

8.25.3 Dokumentation der Datenelemente

8.25.3.1 EPSILON_IN_METER

```
final double test.datumstrategy.MolodenskiiTransformationStandardTest.EPSILON_IN_METER = 0.001
[private]
```

8.25.3.2 EPSILON_IN_RAD

```
final double test.datumstrategy.MolodenskiiTransformationStandardTest.EPSILON_IN_RAD = 0.↩
00000001  [private]
```

8.25.3.3 RHO

```
final double test.datumstrategy.MolodenskiiTransformationStandardTest.RHO = 180/Math.PI  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/MolodenskiiTransformationStandardTest.java

8.26 params.MolodenskyParm Klassenreferenz

Molodensky Parameters.

Öffentliche Methoden

- MolodenskyParm ()

  Transformation parameter from WGS84 to the geodesic datumstrategy. European Datum 1950 (ED50) for West Germany.
- double getTransx ()
- void setTransx (double transx)
- double getTransy ()
- void setTransy (double transy)
- double getTransz ()
- void setTransz (double transz)
- double getDa ()
- void setDa (double da)
- double getDf ()
- void setDf (double df)

Private Attribute

- double transx
- double da

8.26.1 Ausführliche Beschreibung

Molodensky Parameters.

Autor

unknown

Bemerkungen

add header on 2018-02-02 by Yunhao Huang

8.26.2 Beschreibung der Konstruktoren und Destruktoren

8.26.2.1 MolodenskyParm()

```
params.MolodenskyParm.MolodenskyParm ( )
```

Transformation parameter from WGS84 to the geodesic datumstrategy. European Datum 1950 (ED50) for West Germany.

Autor

Nima Mazroob

8.26.3 Dokumentation der Elementfunktionen

8.26.3.1 getDa()

```
double params.MolodenskyParm.getDa ( )
```

8.26.3.2 getDf()

```
double params.MolodenskyParm.getDf ( )
```

8.26.3.3 getTransx()

```
double params.MolodenskyParm.getTransx ( )
```

8.26.3.4 getTransy()

```
double params.MolodenskyParm.getTransy ( )
```

8.26.3.5 getTransz()

```
double params.MolodenskyParm.getTransz ( )
```

8.26.3.6 setDa()

```
void params.MolodenskyParm.setDa (
            double da )
```

8.26.3.7 setDf()

```
void params.MolodenskyParm.setDf (
            double df )
```

8.26.3.8 setTransx()

```
void params.MolodenskyParm.setTransx (
            double transx )
```

8.26.3.9 setTransy()

```
void params.MolodenskyParm.setTransy (
            double transy )
```

8.26.3.10 setTransz()

```
void params.MolodenskyParm.setTransz (
            double transz )
```

8.26.4 Dokumentation der Datenelemente

8.26.4.1 da

```
double params.MolodenskyParm.da  [private]
```

8.26.4.2 transx

```
double params.MolodenskyParm.transx  [private]
```

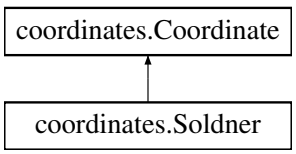
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- params/MolodenskyParm.java

8.27 coordinates.Soldner Klassenreferenz

Class Soldner extends class Coordinate.

Klassendiagramm für coordinates.Soldner:



Öffentliche Methoden

- Soldner (double l0, double b0, double abszisse, double ordinate, double height, int ellipsoidal)
- Soldner (double l0, double b0)
- Soldner ()
- void print ()

  prints Soldner coordinates with reference longitude, -latitude, abscissa, ordinate and height
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ell)

  getAsGeographic returns a GeographicCoordinate
- void getAsTargetCoordinate (EllipsoidParms ell, GeographicCoordinateInterface geocoord)

  fromGeographic calculates Soldner coordinate from geographic coordinate
- double getL0 ()

  getter method that returns the reference latitude of the particular Soldner coordinate
- void setL0 (double l0)

  setter method that accepts the reference latitude of the particular Soldner coordinate
- double getB0 ()

  getter method that returns the reference longitude of the particular Soldner coordinate

- void setB0 (double b0)

  setter method that accepts the reference longitude of the particular Soldner coordinate
- double getAbszisse ()

  getter method that returns the abscissa of the particular Soldner coordinate
- void setAbszisse (double abszisse)

  setter method that accepts the abscissa of the particular Soldner coordinate
- double getOrdinate ()

  getter method that returns the ordinate of the particular Soldner coordinate
- void setOrdinate (double ordinate)

  setter method that accepts the ordinate of the particular Soldner coordinate
- double getHeight ()

  getter method that returns the height of the particular Soldner coordinate
- void setHeight (double height)

  setter method that accepts the height of the particular Soldner coordinate
- int getEllipsoidal ()

  getter method that returns the ellipsoidal of the particular Soldner coordinate
- void setEllipsoidal (int ellipsoidal)

  setter method that accepts the height above ellipsoid of the particular Soldner coordinate

Private Attribute

- double l0
- double b0
- double abszisse
- double ordinate
- double height
- int ellipsoidal

8.27.1 Ausführliche Beschreibung

Class Soldner extends class Coordinate.

Autor

unknown

Bemerkungen

updated header on 2017-11-29 by Markus Mueller

Version

0.1

Parameter

l0	- reference longitude as double
b0	- reference latitude as double
abszisse	- x-value as double
ordinate	- y-value as double
height	- height as double
ellipsoidal	- height above ellipsoid as integer

8.27.2 Beschreibung der Konstruktoren und Destruktoren

8.27.2.1 Soldner() [1/3]

```
coordinates.Soldner.Soldner (
            double l0,
            double b0,
            double abszisse,
            double ordinate,
            double height,
            int ellipsoidal )
```

8.27.2.2 Soldner() [2/3]

```
coordinates.Soldner.Soldner (
            double l0,
            double b0 )
```

8.27.2.3 Soldner() [3/3]

```
coordinates.Soldner.Soldner ( )
```

8.27.3 Dokumentation der Elementfunktionen

8.27.3.1 getAbszisse()

```
double coordinates.Soldner.getAbszisse ( )
```

getter method that returns the abscissa of the particular Soldner coordinate

Rückgabe

abszisse - returns the abscissa of the particular Soldner coordinate as double

8.27.3.2 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.Soldner.getAsGeographicInterface (
            EllipsoidParms ell )
```

getAsGeographic returns a GeographicCoordinate

Parameter

ell	- the ellipsoidal parameters as an instance of EllipsoidParms

Rückgabe

geo - output: returns GeographicCoordinate

Erneute Implementation von coordinates.Coordinate.

8.27.3.3 getAsTargetCoordinate()

```
void coordinates.Soldner.getAsTargetCoordinate (
            EllipsoidParms ell,
            GeographicCoordinateInterface geocoord )
```

fromGeographic calculates Soldner coordinate from geographic coordinate

Parameter

ell	- the ellipsoidal parameters as an instance of EllipsoidParms
geocoord	- a geographic coordinate as an instance of GeographicCoordinate

Erneute Implementation von coordinates.Coordinate.

8.27.3.4 getB0()

```
double coordinates.Soldner.getB0 ( )
```

getter method that returns the reference longitude of the particular Soldner coordinate

Rückgabe

b0 - returns the reference longitude of the particular Soldner coordinate as double

8.27.3.5 getEllipsoidal()

```
int coordinates.Soldner.getEllipsoidal ( )
```

getter method that returns the ellipsoidal of the particular Soldner coordinate

Rückgabe

ellipsoidal - returns the ellipsoidal of the particular Soldner coordinate as integer

8.27.3.6 getHeight()

```
double coordinates.Soldner.getHeight ( )
```

getter method that returns the height of the particular Soldner coordinate

Rückgabe

height - returns the height of the particular Soldner coordinate as double

8.27.3.7 getL0()

```
double coordinates.Soldner.getL0 ( )
```

getter method that returns the reference latitude of the particular Soldner coordinate

Rückgabe

l0 - returns the reference latitude of the particular Soldner coordinate as double

8.27.3.8 getOrdinate()

```
double coordinates.Soldner.getOrdinate ( )
```

getter method that returns the ordinate of the particular Soldner coordinate

Rückgabe

ordinate - returns the ordinate of the particular Soldner coordinate as double

8.27.3.9 print()

```
void coordinates.Soldner.print ( )
```

prints Soldner coordinates with reference longitude, -latitude, abscissa, ordinate and height

Erneute Implementation von coordinates.Coordinate.

8.27.3.10 setAbszisse()

```
void coordinates.Soldner.setAbszisse (
            double abszisse )
```

setter method that accepts the abscissa of the particular Soldner coordinate

Parameter

abszisse	- sets a double representing the abscissa of the particular Soldner coordinate

8.27.3.11 setB0()

```
void coordinates.Soldner.setB0 (
            double b0 )
```

setter method that accepts the reference longitude of the particular Soldner coordinate

Parameter

b0	- sets a double representing the reference longitude of the particular Soldner coordinate

8.27.3.12 setEllipsoidal()

```
void coordinates.Soldner.setEllipsoidal (
            int ellipsoidal )
```

setter method that accepts the height above ellipsoid of the particular Soldner coordinate

Parameter

ellipsoidal	- sets a integer representing the height above ellipsoid of the particular Soldner coordinate

8.27.3.13 setHeight()

```
void coordinates.Soldner.setHeight (
            double height )
```

setter method that accepts the height of the particular Soldner coordinate

Parameter

height	- sets a double representing the height of the particular Soldner coordinate

8.27.3.14 setL0()

```
void coordinates.Soldner.setL0 (
            double l0 )
```

setter method that accepts the reference latitude of the particular Soldner coordinate

Parameter

l0	- sets a double representing the reference latitude of the particular Soldner coordinate

8.27.3.15 setOrdinate()

```
void coordinates.Soldner.setOrdinate (
            double ordinate )
```

setter method that accepts the ordinate of the particular Soldner coordinate

Parameter

ordinate	- sets a double representing the ordinate of the particular Soldner coordinate

8.27.4 Dokumentation der Datenelemente

8.27.4.1 abszisse

```
double coordinates.Soldner.abszisse  [private]
```

x-value

8.27.4.2 b0

```
double coordinates.Soldner.b0  [private]
```

reference latitude

8.27.4.3 ellipsoidal

```
int coordinates.Soldner.ellipsoidal  [private]
```

Height above ellipsoid: 0 => no height (not defined), 1 => ellispsoidal, 2 => geoid

8.27.4.4 height

```
double coordinates.Soldner.height  [private]
```

Height

8.27.4.5 l0

```
double coordinates.Soldner.l0  [private]
```

reference longitude

8.27.4.6 ordinate

```
double coordinates.Soldner.ordinate  [private]
```

y-value

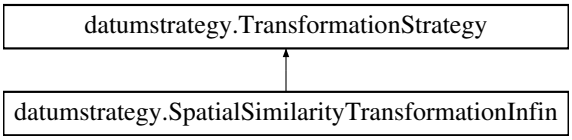
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/Soldner.java

8.28 datumstrategy.SpatialSimilarityTransformationInfin Klassenreferenz

Algorithmic realization of the 3D similarity transformation also known as 7-parameter transformation.

Klassendiagramm für datumstrategy.SpatialSimilarityTransformationInfin:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)

  abstract method for the transformation of a geographic coordinate

8.28.1 Ausführliche Beschreibung

Algorithmic realization of the 3D similarity transformation also known as 7-parameter transformation.

The method takes all needed parameters from the class ControlParms that extends the class EllipsoidParms. Needed parameter for the 7-Param-Transformation: 3 translation-, 1 scale- and 3 rotation -parameters. The start coordinates are taken from the class GeographicCoordinate and have to be converted into cartesian coordinates to realize the transformation. The 7-Param-Transformation is done with cartesian coordinates. After the Transformation, the new cartesian coordinates are converted into ellipsoidal coordinates by an iterative process.

source of conversions: Geodaetische Flaechenkoordinaten, Uebung2, kart2geo.pdf, 20.11.2014 source of 7-Param-Transformation: https://de.wikipedia.org/wiki/Helmert-Transformation

Autor

Andreas Eppler

Bemerkungen

adaptions for ControlParms Singleton on 11.12.2017 by Eva Majer

use the methods of class XYZCoordinate to convert between ellipsoidal and cartesian coordinates on 19.12.17 by Markus Hillemann

changed the class name (CamelCase) on 20.12.17 by Markus Hillemann

implemented the calculation of the 7-Param-Transformation with matrices instead of singular values on 11.↩ 12.2019 by Steven Landgraf

Version

0.1

The method takes all needed parameters from the class ControlParms that extends the class EllipsoidParms. Needed parameter for the 7-Param-Transformation: 3 translation-, 1 scale- and 3 rotation -parameters. The start coordinates are taken from the class GeographicCoordinate and have to be converted into cartesian coordinates to realize the transformation. The 7-Param-Transformation is done with cartesian coordinates. After the Transformation, the new cartesian coordinates are converted into ellipsoidal coordinates by an iterative process.

source of conversions: Geodaetische Flaechenkoordinaten, Uebung2, kart2geo.pdf, 20.11.2014 source of 7-Param-Transformation: https://de.wikipedia.org/wiki/Helmert-Transformation

Autor

Andreas Eppler

Bemerkungen

adaptions for ControlParms Singleton on 11.12.2017 by Eva Majer

use the methods of class XYZCoordinate to convert between ellipsoidal and cartesian coordinates on 19.12.17 by Markus Hillemann

changed the class name (CamelCase) on 20.12.17 by Markus Hillemann

-

Version

0.1

8.28.2 Dokumentation der Elementfunktionen

8.28.2.1 transform()

```
void datumstrategy.SpatialSimilarityTransformationInfin.transform (
            GeographicCoordinateInterface geographicCoordinate )
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation von datumstrategy.TransformationStrategy.

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/SpatialSimilarityTransformationInfin.java

8.29 test.datumstrategy.SpatialSimilarityTransformationInfinTest Klassenreferenz

Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Öffentliche Methoden

- void testTransform ()

Private Attribute

- final double RHO = 180/Math.PI
- final double EPSILON_IN_METER = 0.001
- final double EPSILON_IN_RAD = 0.00000001

8.29.1 Ausführliche Beschreibung

Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Autor

Steven Landgraf

Datum

December 2019

Version

0.1

8.29.2 Dokumentation der Elementfunktionen

8.29.2.1 testTransform()

```
void test.datumstrategy.SpatialSimilarityTransformationInfinTest.testTransform ( )
```

8.29.3 Dokumentation der Datenelemente

8.29.3.1 EPSILON_IN_METER

```
final double test.datumstrategy.SpatialSimilarityTransformationInfinTest.EPSILON_IN_METER =
0.001  [private]
```

8.29.3.2 EPSILON_IN_RAD

```
final double test.datumstrategy.SpatialSimilarityTransformationInfinTest.EPSILON_IN_RAD = 0.↩
00000001  [private]
```

8.29.3.3 RHO

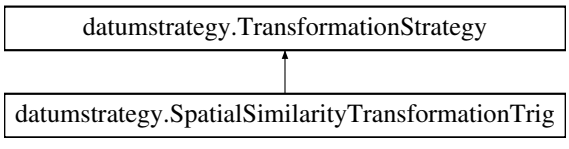
```
final double test.datumstrategy.SpatialSimilarityTransformationInfinTest.RHO = 180/Math.PI
[private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/SpatialSimilarityTransformationInfinTest.java

8.30 datumstrategy.SpatialSimilarityTransformationTrig Klassenreferenz

Klassendiagramm für datumstrategy.SpatialSimilarityTransformationTrig:



Öffentliche Methoden

- void transform (GeographicCoordinateInterface geo)

  abstract method for the transformation of a geographic coordinate

8.30.1 Dokumentation der Elementfunktionen

8.30.1.1 transform()

```
void datumstrategy.SpatialSimilarityTransformationTrig.transform (
            GeographicCoordinateInterface geographicCoordinate )
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation von datumstrategy.TransformationStrategy.

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/SpatialSimilarityTransformationTrig.java

8.31 test.datumstrategy.SpatialSimilarityTransformationTrigTest Klassenreferenz

Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Öffentliche Methoden

- void testTransform ()

Private Attribute

- final double RHO = 180/Math.PI
- final double EPSILON_IN_METER = 0.001
- final double EPSILON_IN_RAD = 0.00000001

8.31.1 Ausführliche Beschreibung

Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Autor

Wentao Lu

Datum

Jan 2020

Version

0.1

8.31.2 Dokumentation der Elementfunktionen

8.31.2.1 testTransform()

```
void test.datumstrategy.SpatialSimilarityTransformationTrigTest.testTransform ( )
```

8.31.3 Dokumentation der Datenelemente

8.31.3.1 EPSILON_IN_METER

```
final double test.datumstrategy.SpatialSimilarityTransformationTrigTest.EPSILON_IN_METER =
0.001  [private]
```

8.31.3.2 EPSILON_IN_RAD

```
final double test.datumstrategy.SpatialSimilarityTransformationTrigTest.EPSILON_IN_RAD = 0.↩
00000001  [private]
```

8.31.3.3 RHO

```
final double test.datumstrategy.SpatialSimilarityTransformationTrigTest.RHO = 180/Math.PI
[private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/datumstrategy/SpatialSimilarityTransformationTrigTest.java

8.32 params.SpatialSimilarityTransformParm Klassenreferenz

Spatial similarity transform parameters.

Öffentliche Methoden

- SpatialSimilarityTransformParm ()
- double getTransx ()
- void setTransx (double transx)
- double getTransy ()
- void setTransy (double transy)
- double getTransz ()
- void setTransz (double transz)
- double getAlpha ()
- void setAlpha (double alpha)
- double getBeta ()
- void setBeta (double beta)
- double getGamma ()
- void setGamma (double gamma)
- double getScale ()
- void setScale (double scale)
- int getFormula ()
- void setFormula (int formula)

Private Attribute

- double transx
- double alpha
- double scale
- int formula

8.32.1 Ausführliche Beschreibung

Spatial similarity transform parameters.

Autor

unknown

Bemerkungen

add header on 2018-02-02 by Yunhao Huang

8.32.2 Beschreibung der Konstruktoren und Destruktoren

8.32.2.1 SpatialSimilarityTransformParm()

```
params.SpatialSimilarityTransformParm.SpatialSimilarityTransformParm ( )
```

8.32.3 Dokumentation der Elementfunktionen

8.32.3.1 getAlpha()

```
double params.SpatialSimilarityTransformParm.getAlpha ( )
```

8.32.3.2 getBeta()

```
double params.SpatialSimilarityTransformParm.getBeta ( )
```

8.32.3.3 getFormula()

```
int params.SpatialSimilarityTransformParm.getFormula ( )
```

8.32.3.4 getGamma()

```
double params.SpatialSimilarityTransformParm.getGamma ( )
```

8.32.3.5 getScale()

```
double params.SpatialSimilarityTransformParm.getScale ( )
```

8.32.3.6 getTransx()

```
double params.SpatialSimilarityTransformParm.getTransx ( )
```

8.32.3.7 getTransy()

```
double params.SpatialSimilarityTransformParm.getTransy ( )
```

8.32.3.8 getTransz()

```
double params.SpatialSimilarityTransformParm.getTransz ( )
```

8.32.3.9 setAlpha()

```
void params.SpatialSimilarityTransformParm.setAlpha (
            double alpha )
```

8.32.3.10 setBeta()

```
void params.SpatialSimilarityTransformParm.setBeta (
            double beta )
```

8.32.3.11 setFormula()

```
void params.SpatialSimilarityTransformParm.setFormula (
            int formula )
```

8.32.3.12 setGamma()

```
void params.SpatialSimilarityTransformParm.setGamma (
            double gamma )
```

8.32.3.13 setScale()

```
void params.SpatialSimilarityTransformParm.setScale (
            double scale )
```

8.32.3.14 setTransx()

```
void params.SpatialSimilarityTransformParm.setTransx (
            double transx )
```

8.32.3.15 setTransy()

```
void params.SpatialSimilarityTransformParm.setTransy (
            double transy )
```

8.32.3.16 setTransz()

```
void params.SpatialSimilarityTransformParm.setTransz (
            double transz )
```

8.32.4 Dokumentation der Datenelemente

8.32.4.1 alpha

```
double params.SpatialSimilarityTransformParm.alpha  [private]
```

8.32.4.2 formula

```
int params.SpatialSimilarityTransformParm.formula  [private]
```

8.32.4.3 scale

```
double params.SpatialSimilarityTransformParm.scale  [private]
```

8.32.4.4 transx

```
double params.SpatialSimilarityTransformParm.transx  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- params/SpatialSimilarityTransformParm.java

8.33 Transformation Klassenreferenz

Main Transformatin class.

Öffentliche, statische Methoden

- static void main (String[ ] args)

8.33.1 Ausführliche Beschreibung

Main Transformatin class.

Autor

Norbert Rösch

Version

0.1

Datum

January 2020

Warnung

For educational purposes only

Copyright

No licence restrictions yet

8.33.2 Dokumentation der Elementfunktionen

8.33.2.1 main()

```
static void Transformation.main (
            String[] args )  [static]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- Transformation.java

8.34 datumstrategy.TransformationStrategy Klassenreferenz

abstract class that encapsulates transformation algorithms for different coordinates
the concrete transformation algorithms that are implemented by the child classes of TransformationStrategy implement the abstract method transform(GeographicCoordinateInterface) that performs the transformation with geographic coordinates as input/output

Klassendiagramm für datumstrategy.TransformationStrategy:

Öffentliche Methoden

- abstract void transform (GeographicCoordinateInterface geographicCoordinate)
  abstract method for the transformation of a geographic coordinate

8.34.1 Ausführliche Beschreibung

abstract class that encapsulates transformation algorithms for different coordinates
the concrete transformation algorithms that are implemented by the child classes of TransformationStrategy implement the abstract method transform(GeographicCoordinateInterface) that performs the transformation with geographic coordinates as input/output

Bemerkungen

last refactored 26.11.2016 by Patrick Huebner

- changed from interface to abstract class
- renamed to TransformationStrategy
- renamed method datum to transform(Coordinate, Coordinate) and made it protected
- added abstract method transform(GeographicCoordinateInterface)

last refactored 11.12.2017 by Eva Majer

last refactored 21.01.2019 by Norbert Rösch (now only object of GeographicCoordinateInterface are allowed to communicate with the different strategies

- adaptions for ControlParms Singleton
- Translation of some comments

8.34.2 Dokumentation der Elementfunktionen

8.34.2.1 transform()

```
abstract void datumstrategy.TransformationStrategy.transform (
            GeographicCoordinateInterface geographicCoordinate )  [abstract]
```

abstract method for the transformation of a geographic coordinate

Parameter

geographicCoordinate	- an object of type GeographicCoordinateInterface which is used for input/output for the transformation algorithm

Erneute Implementation in datumstrategy.MockStrategy, datumstrategy.CardansTransformation, datumstrategy.EulersTransformation, datumstrategy.MolodenskiiTransformationStandard, datumstrategy.MolodenskiiTransformationAbridged, datumstrategy.SpatialSimilar und datumstrategy.SpatialSimilarityTransformationTrig.

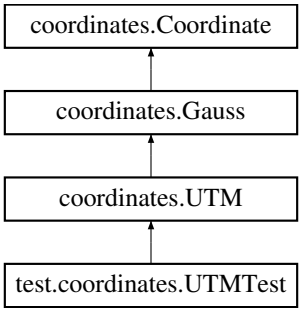
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- datumstrategy/TransformationStrategy.java

8.35 coordinates.UTM Klassenreferenz

Class UTM extends class Gauss.

Klassendiagramm für coordinates.UTM:



Öffentliche Methoden

- UTM ()
- void init ()
- void print ()

  prints UTM coordinates
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ell)

  getAsGeographic returns a GeographicCoordinate object

- void getAsTargetCoordinate (EllipsoidParms ell, GeographicCoordinateInterface geocoord)

  fromGeographic calculates UTM coordinate from geographic coordinate
- double getEast ()
- void setEast (double east)
- double getNorth ()
- void setNorth (double north)
- int getZone ()
- void setZone (int zone)
- boolean isNorthhem ()
- void setNorthhem (boolean northhem)

Private Attribute

- double east
- double north
- int zone
- boolean northhem

Weitere Geerbte Elemente

8.35.1 Ausführliche Beschreibung

Class UTM extends class Gauss.

Autor

unknown

Bemerkungen

updated header on 2017-11-29 by Markus Mueller

Version

0.1

Parameter

east	- easting as double
north	- Northing as double
zone	- UTM-Zone as integer
northhem	- hemisphere (0: North or 1:South) as boolean

8.35.2 Beschreibung der Konstruktoren und Destruktoren

8.35.2.1 UTM()

```
coordinates.UTM.UTM ( )
```

8.35.3 Dokumentation der Elementfunktionen

8.35.3.1 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.UTM.getAsGeographicInterface (
            EllipsoidParms ell )
```

getAsGeographic returns a GeographicCoordinate object

Parameter

ell	- ellipsoidal parameters

Rückgabe

geo - output: GeographicCoordinate

Erneute Implementation von coordinates.Gauss.

8.35.3.2 getAsTargetCoordinate()

```
void coordinates.UTM.getAsTargetCoordinate (
            EllipsoidParms ell,
            GeographicCoordinateInterface geocoord )
```

fromGeographic calculates UTM coordinate from geographic coordinate

Parameter

ell	- the ellipsoidal parameters as an instance of EllipsoidParms
geocoord	- a geographic coordinate as an instance of GeographicCoordinate

Erneute Implementation von coordinates.Coordinate.

8.35.3.3 getEast()

```
double coordinates.UTM.getEast ( )
```

8.35.3.4 getNorth()

```
double coordinates.UTM.getNorth ( )
```

8.35.3.5 getZone()

```
int coordinates.UTM.getZone ( )
```

8.35.3.6 init()

```
void coordinates.UTM.init ( )
```

8.35.3.7 isNorthhem()

```
boolean coordinates.UTM.isNorthhem ( )
```

8.35.3.8 print()

```
void coordinates.UTM.print ( )
```

prints UTM coordinates

Erneute Implementation von coordinates.Gauss.

8.35.3.9 setEast()

```
void coordinates.UTM.setEast (
            double east )
```

8.35.3.10 setNorth()

```
void coordinates.UTM.setNorth (
            double north )
```

8.35.3.11 setNorthhem()

```
void coordinates.UTM.setNorthhem (
            boolean northhem )
```

8.35.3.12 setZone()

```
void coordinates.UTM.setZone (
            int zone )
```

8.35.4 Dokumentation der Datenelemente

8.35.4.1 east

```
double coordinates.UTM.east  [private]
```

Easting

8.35.4.2 north

```
double coordinates.UTM.north  [private]
```

Northing

8.35.4.3 northhem

```
boolean coordinates.UTM.northhem  [private]
```

Hemisphere: 0 => North, 1 => South

8.35.4.4 zone

```
int coordinates.UTM.zone  [private]
```

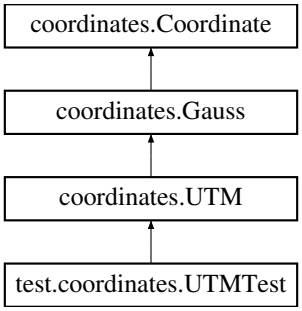
coordinates.UTM-Zone

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/UTM.java

8.36 test.coordinates.UTMTest Klassenreferenz

Klassendiagramm für test.coordinates.UTMTest:



Öffentliche Methoden

- void testGetAsGeographicInterface ()
- void testGetAsUTM ()

Weitere Geerbte Elemente

8.36.1 Dokumentation der Elementfunktionen

8.36.1.1 testGetAsGeographicInterface()

```
void test.coordinates.UTMTest.testGetAsGeographicInterface ( )
```

8.36.1.2 testGetAsUTM()

```
void test.coordinates.UTMTest.testGetAsUTM ( )
```

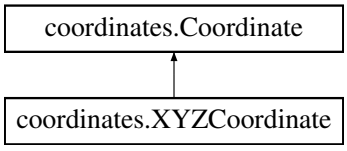
Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/UTMTest.java

8.37 coordinates.XYZCoordinate Klassenreferenz

Class XYZCoordinate.

Klassendiagramm für coordinates.XYZCoordinate:



Öffentliche Methoden

- XYZCoordinate ()

  main constructor to set the coordinates
- void init ()
- XYZCoordinate (double xValue, double yValue, double zValue)

  Constructor for generating a geocentricCoordinate.
- XYZCoordinate (double xValue, double yValue)
- GeographicCoordinateInterface getAsGeographicInterface (EllipsoidParms ell)

  Function for transforming geocentric coordinates to geographic coordinates.
- void getAsTargetCoordinate (EllipsoidParms ell, GeographicCoordinateInterface geocoord)

  Function for transforming geographic coordinates to geocentric coordinates.
- void print ()

  abstract methnd that allows the concrete Coordinate to be output on screen
- double getX ()

  getter method that returns the x-coordinate of the particular XYZCoordinate
- void setX (double x)

  setter method that accepts x-coordinate for the particular XYZCoordinate
- double getY ()

  getter method that returns the y-coordinate of the particular XYZCoordinate
- void setY (double y)

  setter method that accepts y-coordinate for the particular XYZCoordinate
- double getZ ()

  getter method that returns the z-coordinate of the particular XYZCoordinate
- void setZ (double z)

  setter method that accepts z-coordinate for the particular XYZCoordinate

Private Attribute

- double x

8.37.1 Ausführliche Beschreibung

Class XYZCoordinate.

Autor

David Li

Bemerkungen

2016-12-04 removed unused comments and variables by David Li

2016-12-04 added new method calculateRotationMatrix(SpatialSimilarityTransformParm) by David Li

2018-01-29 added constructor with ControlParms by Markus Mueller

Version

0.1

Parameter

x	- x-coordinate as double
y	- y-coordinate as double
z	- z-coordinate as double

8.37.2 Beschreibung der Konstruktoren und Destruktoren

8.37.2.1 XYZCoordinate() [1/3]

```
coordinates.XYZCoordinate.XYZCoordinate ( )
```

main constructor to set the coordinates

8.37.2.2 XYZCoordinate() [2/3]

```
coordinates.XYZCoordinate.XYZCoordinate (
            double xValue,
            double yValue,
            double zValue )
```

Constructor for generating a geocentricCoordinate.

Bemerkungen

parameters changed to x-, y- and zAxis (were too inexpressive x1, x2 and x3) by unknown

2018-01-25 renamed parameters to xValue, yValue, zValue (were xAxis, yAxis, zAxis before) by Markus MÃ¼ller

Parameter

xValue	- x component of XYZ coordinate
yValue	- y component of XYZ coordinate
zValue	- z component of XYZ coordinate

8.37.2.3 XYZCoordinate() [3/3]

```
coordinates.XYZCoordinate.XYZCoordinate (
            double xValue,
            double yValue )
```

8.37.3 Dokumentation der Elementfunktionen

8.37.3.1 getAsGeographicInterface()

```
GeographicCoordinateInterface coordinates.XYZCoordinate.getAsGeographicInterface (
            EllipsoidParms ell )
```

Function for transforming geocentric coordinates to geographic coordinates.

Implemented by Michael Loos on 16.06.1998, based on a FORTRAN-Subroutine from 12.08.1993 by Hansjoerg Kutterer

=> Needs the function 'Constant' from LatParm.java!

Autor

Michael Loos

Bemerkungen

renamed the variable bralt to altitude by David Li 2016-12-04

renamed the variable eps to maxLonLatDistance by David Li 2016-12-04

formal changes in summer 2000 by Daniel Mueller

Parameter

ell	- an object of type EllipsoidParms

Rückgabe

geo - returns geographic coordinate consisting of the double values latitude, longitude and ellipsoidal height

Erneute Implementation von coordinates.Coordinate.

8.37.3.2 getAsTargetCoordinate()

```
void coordinates.XYZCoordinate.getAsTargetCoordinate (
            EllipsoidParms ell,
            GeographicCoordinateInterface geocoord )
```

Function for transforming geographic coordinates to geocentric coordinates.

Autor

Michael Loos, 1998-06-06 as of a FORTRAN-Subroutine from Hansjoerg Kutterer, 1993-08-12

Bemerkungen

formal changes in Summer 2000 by Daniel Mueller

Java-Version in February 2003 by Norbert Roesch

Algorithm as of G. Schmitt, M. Illner and R. Jaeger, "Transformationsprobleme", pp. 125-142 in Mitteilungen des D↩ VW Landesvereins BaWue, Sonderheft "GPS und Integration von GPS in bestehende geodaetische Netze", 1991.

Parameter

ell	- an object of type EllipsoidParms that represents ellipsoidal parameters
geocoord	- an object of type GeographicCoordinate that represents the geographic coordinate to transform

Erneute Implementation von coordinates.Coordinate.

8.37.3.3 getX()

```
double coordinates.XYZCoordinate.getX ( )
```

getter method that returns the x-coordinate of the particular XYZCoordinate

Rückgabe

x - returns the x-coordinate value of the particular Coordinate point as double

8.37.3.4 getY()

```
double coordinates.XYZCoordinate.getY ( )
```

getter method that returns the y-coordinate of the particular XYZCoordinate

Rückgabe

y - returns the y-coordinate value of the particular Coordinate point as double

8.37.3.5 getZ()

```
double coordinates.XYZCoordinate.getZ ( )
```

getter method that returns the z-coordinate of the particular XYZCoordinate

Rückgabe

z - returns the z-coordinate value of the particular Coordinate point as double

8.37.3.6 init()

```
void coordinates.XYZCoordinate.init ( )
```

8.37.3.7 print()

```
void coordinates.XYZCoordinate.print ( )
```

abstract methnd that allows the concrete Coordinate to be output on screen

Erneute Implementation von coordinates.Coordinate.

8.37.3.8 setX()

```
void coordinates.XYZCoordinate.setX (
            double x )
```

setter method that accepts x-coordinate for the particular XYZCoordinate

Parameter

x	- sets a double representing the x-coordinate value for the particular XYZCoordinate

8.37.3.9 setY()

```
void coordinates.XYZCoordinate.setY (
            double y )
```

setter method that accepts y-coordinate for the particular XYZCoordinate

Parameter

y	- sets a double representing the y-coordinate value for the particular XYZCoordinate

8.37.3.10 setZ()

```
void coordinates.XYZCoordinate.setZ (
            double z )
```

setter method that accepts z-coordinate for the particular XYZCoordinate

Parameter

z	- sets a double representing the z-coordinate value for the particular XYZCoordinate

8.37.4 Dokumentation der Datenelemente

8.37.4.1 x

```
double coordinates.XYZCoordinate.x  [private]
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- coordinates/XYZCoordinate.java

8.38 test.coordinates.XYZCoordinateTest Klassenreferenz

Öffentliche Methoden

- void testGetAsGeographicInterface ()
- void testGetAsTargetCoordinate ()

8.38.1 Dokumentation der Elementfunktionen

8.38.1.1 testGetAsGeographicInterface()

```
void test.coordinates.XYZCoordinateTest.testGetAsGeographicInterface ( )
```

Bemerkungen

got reference data from www.sapos-bw.de/trafoErg_B_X.php

8.38.1.2 testGetAsTargetCoordinate()

```
void test.coordinates.XYZCoordinateTest.testGetAsTargetCoordinate ( )
```

Die Dokumentation für diese Klasse wurde erzeugt aufgrund der Datei:

- test/coordinates/XYZCoordinateTest.java

Kapitel 9

Datei-Dokumentation

9.1 C:/Users/YangXiaofei/Desktop/Workplace0115/Transformation1/bin/↩ README.md-Dateireferenz

9.2 coordinates/Coordinate.java-Dateireferenz

Klassen

- class coordinates.Coordinate

  Abstract class that represents a coordinate. Enables any concrete Coordinate class be used as input for TransformationStrategy which relies on geographic coordinates as input/output

Pakete

- package coordinates

9.3 coordinates/Gauss.java-Dateireferenz

Klassen

- class coordinates.Gauss

  Class Gauss extends class Coordinate.

Pakete

- package coordinates

9.4 coordinates/GaussKrueger.java-Dateireferenz

Klassen

- class coordinates.GaussKrueger

  Coordinate point relating to a certain Gauss-Krueger reference meridian.

Pakete

- package coordinates

9.5 coordinates/GeographicCoordinate.java-Dateireferenz

Klassen

- class coordinates.GeographicCoordinate

  concrete implementation of abstract class Coordinate, represents a geographic coordinate (as input coordinate)

Pakete

- package coordinates

9.6 coordinates/GeographicCoordinateInterface.java-Dateireferenz

Klassen

- class coordinates.GeographicCoordinateInterface

  concrete implementation of abstract class Coordinate, represents a geographic coordinate (As interface for strategy)

Pakete

- package coordinates

9.7 coordinates/GetAppropriateCoordinate.java-Dateireferenz

Klassen

- class coordinates.GetAppropriateCoordinate

  Coordinate factory for plane coordinates and geographic coordinates.

Pakete

- package coordinates

9.8 coordinates/Soldner.java-Dateireferenz

Klassen

- class coordinates.Soldner

  Class Soldner extends class Coordinate.

Pakete

- package coordinates

9.9 coordinates/UTM.java-Dateireferenz

Klassen

- class coordinates.UTM

  Class UTM extends class Gauss.

Pakete

- package coordinates

9.10 coordinates/XYZCoordinate.java-Dateireferenz

Klassen

- class coordinates.XYZCoordinate

  Class XYZCoordinate.

Pakete

- package coordinates

9.11 datumstrategy/CardansTransformation.java-Dateireferenz

Klassen

- class datumstrategy.CardansTransformation

  Algorithmic realization of Translation and the Cardan's Rotation.

Pakete

- package datumstrategy

9.12 datumstrategy/EulersTransformation.java-Dateireferenz

Klassen

- class datumstrategy.EulersTransformation

  Algorithmic realization of the Euler's transformation.

Pakete

- package datumstrategy

9.13 datumstrategy/GetAppropriateTransformationAlgorithm.java-↩ Dateireferenz

Klassen

- class datumstrategy.GetAppropriateTransformationAlgorithm

Pakete

- package datumstrategy

9.14 datumstrategy/MockStrategy.java-Dateireferenz

Klassen

- class datumstrategy.MockStrategy

Pakete

- package datumstrategy

9.15 datumstrategy/MolodenskiiTransformationAbridged.java-↩ Dateireferenz

Klassen

- class datumstrategy.MolodenskiiTransformationAbridged

  Algorithmic realization of the abridged molodensky transformation.

Pakete

- package datumstrategy

9.16 datumstrategy/MolodenskiiTransformationStandard.java-↩ Dateireferenz

Klassen

- class datumstrategy.MolodenskiiTransformationStandard

  Algorithmic realization of the molodensky transformation.

Pakete

- package datumstrategy

9.17 datumstrategy/SpatialSimilarityTransformationInfin.java-↩ Dateireferenz

Klassen

- class datumstrategy.SpatialSimilarityTransformationInfin

  Algorithmic realization of the 3D similarity transformation also known as 7-parameter transformation.

Pakete

- package datumstrategy

9.18 datumstrategy/SpatialSimilarityTransformationTrig.java-↩ Dateireferenz

Klassen

- class datumstrategy.SpatialSimilarityTransformationTrig

Pakete

- package datumstrategy

9.19 datumstrategy/TransformationStrategy.java-Dateireferenz

contains abstract class TransformationStrategy

Klassen

- class datumstrategy.TransformationStrategy

  abstract class that encapsulates transformation algorithms for different coordinates
  the concrete transformation algorithms that are implemented by the child classes of TransformationStrategy implement the abstract method transform(GeographicCoordinateInterface) that performs the transformation with geographic coordinates as input/output

Pakete

- package datumstrategy

9.19.1 Ausführliche Beschreibung

contains abstract class TransformationStrategy

Autor

unknown as of 11.2016

9.20 params/ControlParms.java-Dateireferenz

Klassen

- class params.ControlParms

  Class ControlParms extends class EllipsoidParms.

Pakete

- package params

9.21 params/EllipsoidParms.java-Dateireferenz

Klassen

- class params.EllipsoidParms

  Ellipsoid parameters.

Pakete

- package params

9.22 params/LatParm.java-Dateireferenz

Klassen

- class params.LatParm
  Latitude Parameters.

Pakete

- package params

9.23 params/MolodenskyParm.java-Dateireferenz

Klassen

- class params.MolodenskyParm
  Molodensky Parameters.

Pakete

- package params

9.24 params/SpatialSimilarityTransformParm.java-Dateireferenz

Klassen

- class params.SpatialSimilarityTransformParm
  Spatial similarity transform parameters.

Pakete

- package params

9.25 test/coordinates/AllTests.java-Dateireferenz

Klassen

- class test.coordinates.AllTests

Pakete

- package test.coordinates

9.26 test/coordinates/CoordinateFactoryTest.java-Dateireferenz

Klassen

- class test.coordinates.CoordinateFactoryTest

  Coordinate factory for plane coordinates and geographic coordinates.

Pakete

- package test.coordinates

9.27 test/coordinates/GaussKruegerTest.java-Dateireferenz

Klassen

- class test.coordinates.GaussKruegerTest

  Test class with unit tests to test behavior class GaussKrueger.

Pakete

- package test.coordinates

9.28 test/coordinates/GaussTest.java-Dateireferenz

Klassen

- class test.coordinates.GaussTest

  Test class with unit tests to test behavior class Gauss.

Pakete

- package test.coordinates

9.29 test/coordinates/GeographicCoordinateTest.java-Dateireferenz

Klassen

- class test.coordinates.GeographicCoordinateTest

Pakete

- package test.coordinates

9.30 test/coordinates/UTMTest.java-Dateireferenz

Klassen

- class test.coordinates.UTMTest

Pakete

- package test.coordinates

9.31 test/coordinates/XYZCoordinateTest.java-Dateireferenz

Klassen

- class test.coordinates.XYZCoordinateTest

Pakete

- package test.coordinates

9.32 test/datumstrategy/GetAppropriateTransformationAlgorithmTest.java-Dateireferenz

Klassen

- class test.datumstrategy.GetAppropriateTransformationAlgorithmTest

Pakete

- package test.datumstrategy

9.33 test/datumstrategy/MockStrategyTest.java-Dateireferenz

Klassen

- class test.datumstrategy.MockStrategyTest

  Test class with two integration tests to test the transition of a Gauss-Krueger-coordinate from the third to the fourth strip and vice versa. The datumstrategy "MockStrategy" is used.

Pakete

- package test.datumstrategy

9.34 test/datumstrategy/MolodenskiiTransformationAbridgedTest.java-↩ Dateireferenz

Klassen

- class test.datumstrategy.MolodenskiiTransformationAbridgedTest

  Test of the algorithmic realization of the abridged molodensky transformation.

Pakete

- package test.datumstrategy

9.35 test/datumstrategy/MolodenskiiTransformationStandardTest.java-↩ Dateireferenz

Klassen

- class test.datumstrategy.MolodenskiiTransformationStandardTest

  Tests the Molodenskii Transformation Standard as a Datum Strategy. Input values and expected values were calculated by hand.

Pakete

- package test.datumstrategy

9.36 test/datumstrategy/SpatialSimilarityTransformationInfinTest.java-↩ Dateireferenz

Klassen

- class test.datumstrategy.SpatialSimilarityTransformationInfinTest

  Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Pakete

- package test.datumstrategy

9.37 test/datumstrategy/SpatialSimilarityTransformationTrigTest.java-↩ Dateireferenz

Klassen

- class test.datumstrategy.SpatialSimilarityTransformationTrigTest

  Tests the Spatial Similarity Transformation as a Datum Strategy. Input values and expected values were calculated by hand.

Pakete

- package test.datumstrategy

9.38 test/params/LatParmTest.java-Dateireferenz

Klassen

- class test.params.LatParmTest

Pakete

- package test.params

9.39 Transformation.java-Dateireferenz

Klassen

- class Transformation

  Main Transformatin class.

Index