

User Manual 3.3 Spheroids

De Wiki

Aller à : [navigation](#), [rechercher](#)

[User Manual 3.3 Spheroids](#)

Sommaire

- [1 Definition](#)
- [2 Implementation](#)
- [3 Instantiation](#)
- [4 Usage](#)

Definition

A spheroid, or ellipsoid of revolution is a quadric surface obtained by rotating an ellipse about one of its principal axes; in other words, an ellipsoid with two equal equatorial radii. Assuming the XYZ coordinate system is such that the spheroid is centered and axis-aligned, the spheroids equation is given by:

$$\mathcal{S} = \left\{ (x, y, z) \in \mathbb{R}^3 \mid \frac{x^2 + y^2}{a^2} + \frac{z^2}{b^2} = 1 \right\}$$



The equatorial radius is called the transverse radius whereas the polar radius b is the conjugate radius.

Implementation

The Spheroid object in the SIRIUS library implements the [Ellipsoid interface](#). Please refer to the [Javadoc](#) for a complete list of public methods.

Instantiation

In order to instantiate a spheroid object, the user must specify the spheroids' center, it's axis of revolution and both semi-axis (the transverse radius a and the conjugate radius b). For example :

```
// Spheroid parameters
Vector3D position = new Vector3D(1, 2, 3);
Vector3D revAxis = new Vector3D(0, 1, 1);
double a = 2.0;
double b = 1.0;
// The spheroid itself
Spheroid mySpheroid = new Spheroid(position, revAxis, a, b);
```

Usage

Please refer to the [\[MAT_GEO_Home#HInteractions Interactions with other geometrical objects](#)

section] for methods inherited from the Shape interface.

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Menu de navigation

Outils personnels

- [18.224.65.198](#)
- [Discussion avec cette adresse IP](#)
- [Créer un compte](#)
- [Se connecter](#)

Espaces de noms

- [Page](#)
- [Discussion](#)

Variantes

Affichages

- [Lire](#)
- [Voir le texte source](#)
- [Historique](#)
- [Exporter en PDF](#)

Plus

Rechercher

PATRIUS

- [Welcome](#)

Evolutions

- [Main differences between V4.15 and V4.14](#)
- [Main differences between V4.14 and V4.13](#)
- [Main differences between V4.13 and V4.12](#)

- [Main differences between V4.12 and V4.11](#)
- [Main differences between V4.11 and V4.10](#)
- [Main differences between V4.10 and V4.9](#)
- [Main differences between V4.9 and V4.8](#)
- [Main differences between V4.8 and V4.7](#)
- [Main differences between V4.7 and V4.6.1](#)
- [Main differences between V4.6.1 and V4.5.1](#)
- [Main differences between V4.5.1 and V4.4](#)
- [Main differences between V4.4 and V4.3](#)
- [Main differences between V4.3 and V4.2](#)
- [Main differences between V4.2 and V4.1.1](#)
- [Main differences between V4.1.1 and V4.1](#)
- [Main differences between V4.1 and V4.0](#)
- [Main differences between V4.0 and V3.4.1](#)

User Manual

- [User Manual 4.15](#)
- [User Manual 4.14](#)
- [User Manual 4.13](#)
- [User Manual 4.12](#)
- [User Manual 4.11](#)
- [User Manual 4.10](#)
- [User Manual 4.9](#)
- [User Manual 4.8](#)
- [User Manual 4.7](#)
- [User Manual 4.6.1](#)
- [User Manual 4.5.1](#)
- [User Manual 4.4](#)
- [User Manual 4.3](#)
- [User Manual 4.2](#)
- [User Manual 4.1](#)
- [User Manual 4.0](#)
- [User Manual 3.4.1](#)
- [User Manual 3.3](#)

Tutorials

- [Tutorials 4.15](#)
- [Tutorials 4.14](#)
- [Tutorials 4.13.5](#)
- [Tutorials 4.12.1](#)
- [Tutorials 4.8.1](#)
- [Tutorials 4.5.1](#)
- [Tutorials 4.4](#)
- [Tutorials 4.1](#)
- [Tutorials 4.0](#)

Links

- [CNES freeware server](#)

Navigation

- [Accueil](#)
- [Modifications récentes](#)
- [Page au hasard](#)
- [Aide](#)

Outils

- [Pages liées](#)
- [Suivi des pages liées](#)
- [Pages spéciales](#)
- [Adresse de cette version](#)
- [Information sur la page](#)
- [Citer cette page](#)

- Dernière modification de cette page le 4 avril 2018 à 14:13.
- [Politique de confidentialité](#)
- [À propos de Wiki](#)
- [Avertissements](#)

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