

# User Manual 4.0 Spheres

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### Definition

A sphere is an ellipsoid with equal equatorial and polar radii. Assuming the XYZ coordinate system is such that the sphere is centered and axis-aligned, the spheres' equation is given by:

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



### Implementation

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

### Instantiation

The sphere object is built from a centre (Vector3D) and a radius :

```
Vector3D centre = new Vector3D(1.0, 5.0, -2.0);
double radius = 1.2;
Sphere sphere = new Sphere(centre, radius);
```

### 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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