

# User Manual 4.0 Infinite Rectangle Cylinder

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### Definition

The infinite rectangle cylinders are defined in a 3D space by their axis (a line or two equivalent vectors origin and direction), the direction of their local frame U vector and their two dimensions (length on the U axis and width on V) :



### Implementation

The Infinite Rectangle Cylinder object in the SIRIUS library implements the [infinite cylinder interface](#) and has the following constructor and public methods :

- InfiniteEllipticCylinder(Vector3D, Vector3D, double, double)
- intersects(Line) : boolean
- getIntersectionPoints(Line) : Vector3D[]
- closestPointTo(Line) : Vector3D[]
- distanceTo(Line) : double

Please refer to the [Javadoc](#) for a complete list of public methods.

### Instantiation

The object is built from three vectors (Vector3D) and two doubles :

```
Vector3D origin = new Vector3D(1.0, 1.0, 1.0);
Vector3D direction = new Vector3D(2.0, 0.0, 0.0);
Vector3D inputUvector = new Vector3D(1.0, 1.0, 0.0);
double length = 2.0;
double width = 4.0;
InfiniteRectangleCylinder cylinder = new InfiniteRectangleCylinder(origin,
direction, inputUvector, length, width);
```

Or directly from a Line, a non-colinear vector and two doubles :

```
Line axis = new Line(origin, direction);
```

```
Vector3D inputUvector = new Vector3D(1.0, 1.0, 0.0);
double length = 2.0;
double width = 4.0;
InfiniteRectangleCylinder cylinder = new InfiniteRectangleCylinder(axis,
inputUvector, length, width);
```

The local frame is built such as :

- The axis is the W vector
- U is orthogonal to W and its direction is defined by the 'input U vector'
- V completes the frame

## 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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