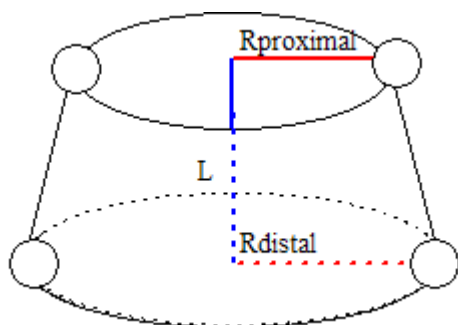


Segment Volume

Visual3D models segments as cones, cylinders, spheres, and ellipsoids. Visual3D doesn't compute the volume of a segment based on these geometries, but the calculations are straightforward.

Volume of Conical Frustrum

One of the Visual3D segment geometries is labeled a **Cone**. To be precise the **Cone** refers to a **conical frustrum**. A **frustra of right cones** is created by cutting the top off of a cone such that the cut is parallel to the base of the cone.



A frustra of right cones is created by cutting the top off of a cone such that the cut is parallel to the base of the cone.

The volume of a conical frustrum is:

$$Volume = \frac{\pi L (R_{distal}^2 + R_{distal}R_{proximal} + R_{proximal}^2)}{3}$$

This value is not computed by default, but can be added as a Model Metric Item.

This value is not

Enter New Value for RTH_Volume

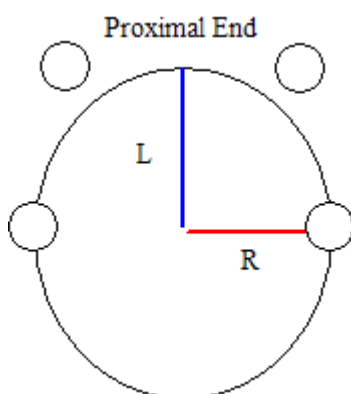
Name
RTH_Volume

Value or Expression
 $4 \cdot \pi (RTH_Distal_Radius^2 + RTH_Distal_Radius \cdot RTH_Proximal_Radius + RTH_Proximal_Radius^2) / 3$

OK Cancel

Volume of Ellipsoid

In Visual3D the inertial properties of an ellipsoid (sphere) are calculated using only the distal radius.

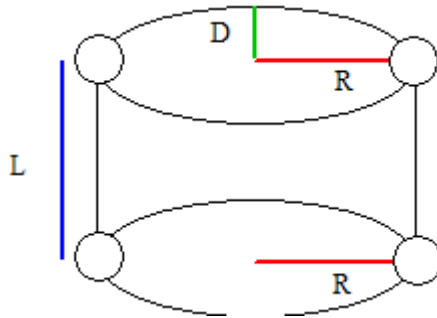


The distance from the proximal end of the segment to the center of mass of the segment.

$$CG_from_proximal_end = L$$

$$Volume = 4\pi LR_{distal}^2$$

Volume of Elliptical Cylinder



as the Radius of the cylinder.

Visual3D uses the Radius at the distal end of the segment

$$Volume = \frac{\pi}{4} L R_{distal} R_{proximal}$$

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