Question

Identify an axis of revolution and generating conic of the surface $4x^2 + 25y^2 + 4z^2 = 100.$ Does this conic also generate

$$\frac{x^2}{4} + \frac{y^2}{25} + \frac{z^2}{4} = 1$$

Give reasons for your answer.

Solution

$$4x^2 + 25y^2 + 4z^2 = 100$$

$$\frac{4x^2 + 25y^2 + 4z^2}{100} = \frac{100}{100}$$

$$\frac{x^2 + z^2}{25} + \frac{y^2}{4} = 1$$

We have the spheroid (ellipsoid of revolution). Its rotation axis is $y-$axis.

$$\frac{x^2}{4} + \frac{y^2}{25} + \frac{z^2}{4} = 1$$

We have the spheroid (ellipsoid of revolution). Its rotation axis is $y-$axis.

We see that both have the same rotation axis which is the $y-$axis.