

A Double Cone

As explained in the introduction to this gallery a surface is called *non-singular* or smooth if it does not have any apex (such points are called singularities). For example, a sphere or a torus (two leftmost pictures below):



The double cone (rightmost picture) is the simplest singularity; it is the only singularity which can be described by an equation of degree 2:

$$x^2 + y^2 - z^2 = 0.$$

When changing this equation slightly by replacing the 0 by a small value $a \neq 0$, the double cone transforms into one of the two types of hyperboloids, depending on the sign of a :



A surface of degree 2 cannot have more than one singularity, i.e. $\mu(2) = 1$.