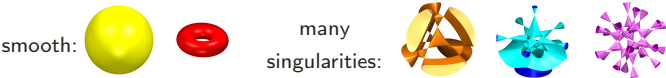


World Record Surfaces

A surface is called *non-singular* or *smooth* if it does not have any apex (such points are called *singularities*). Examples of smooth surfaces are a sphere or a torus, see the first 2 pictures below. This is almost sure the case when choosing a random surface.



Thus it is very special when a surface exhibits singularities. They are the most interesting points of a surface. The surfaces in the SURFER programme are defined by polynomials. The highest power of a polynomial is called its degree d . Mathematicians ask how many singularities a surface of a certain degree may have. We will denote this number by $\mu(d)$.

It turns out that this number $\mu(d)$ is very difficult to compute. Since the 19th century, $\mu(d)$ is known for $d = 1, 2, 3, 4$, but for $d = 5$ this number was only identified in 1980, and for $d = 6$ in 1996. For $d \geq 7$, $\mu(d)$ is still unknown.

So, every new world record for a $\mu(d)$ is an important partial result. It seems to take a lot more time to completely solve this problem for arbitrary d .

A few known results:

d	1	2	3	4	5	6	7	8	d
$\mu(d) \geq$	0	1	4	16	31	65	99	168	$\approx \frac{5}{12}d^3$
$\mu(d) \leq$	0	1	4	16	31	65	104	174	$\approx \frac{4}{9}d^3$