

## A Togliatti Quintic

Eugenio Giuseppe Togliatti proved in 1937 that a surface of degree 5 (quintic) with exactly 31 singularities exists — a world record at that time.

In 1980 it was Arneau Beauville who used an interesting relation to coding theory in order to show the non-existence of a quintic with more singularities. This means that Togliatti's world record can never be improved!

As there is no platonic solid whose symmetry planes one could use in order to construct a surface of degree 5 similar to Kummer's Quartic or Barth's Sextic the quintic with 31 singularities has fewer symmetries, namely the symmetries of the plane pentagon.

The equation we use here was found by Wolf Barth (1990); we use this one because Togliatti's original surface is not easy to visualize.