Quaste

The ABC of equations

$$8z^9 - 24x^2z^6 - 24y^2z^6 + 36z^8 + 24x^4z^3 - 168x^2y^2z^3$$
$$+24y^4z^3 - 72x^2z^5 - 72y^2z^5 + 54z^7 - 8x^6 - 24x^4y^2$$
$$-24x^2y^4 - 8y^6 + 36x^4z^2 - 252x^2y^2z^2 + 36y^4z^2$$
$$-54x^2z^4 - 108y^2z^4 + 27z^6 - 108x^2y^2z + 54y^4z$$
$$-54y^2z^3 + 27y^4 = 0$$

Did you have a close look at the equation of Quaste? It looks very complicated. The figure itself can be described in simple words: the upper border has the form of the Greek letter α, the right border has the shape of a curve with a peak. Such a peak is called *cusp*. If you drag such a cusp along the alpha curve you obtain Quaste. Surfaces with such a property are called Cartesian products, in honour of the French mathematician René Descartes.

Monomials of degree 1 are x, y, z. Monomials of degree 2 are $x^2, xy, y^2, xz, yz, z^2$. And so on. The higher the degree, the more monomials we have, and this affords us more possibilities to create more complicated shapes. It is like an alphabet: if we have more letters at our disposal, we can write more complex words and phrases.