

**Designing algebraic surfaces of all
degrees by means of coefficients
algebraically equations**

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Method of settings coefficients of equation to -1,0 and 1

Even if we consider only those equations, that
have a_{34} through a_0 set to -1, 0 or 1 we get

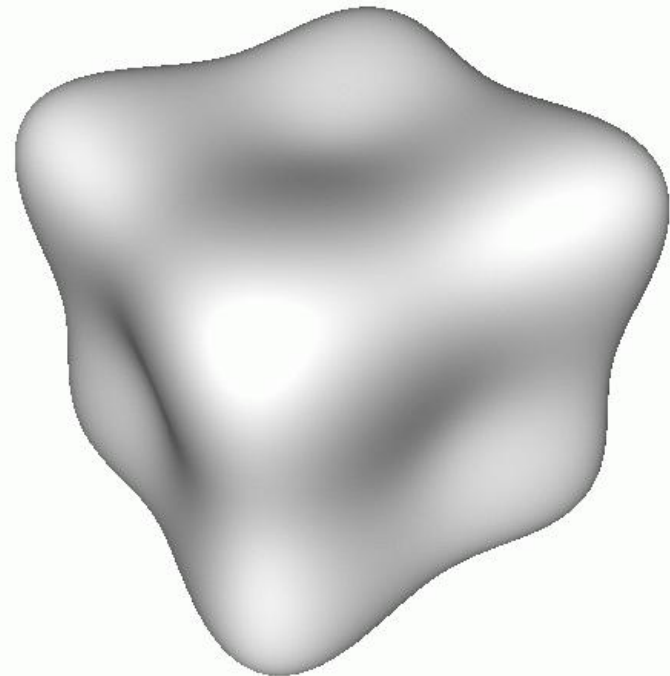
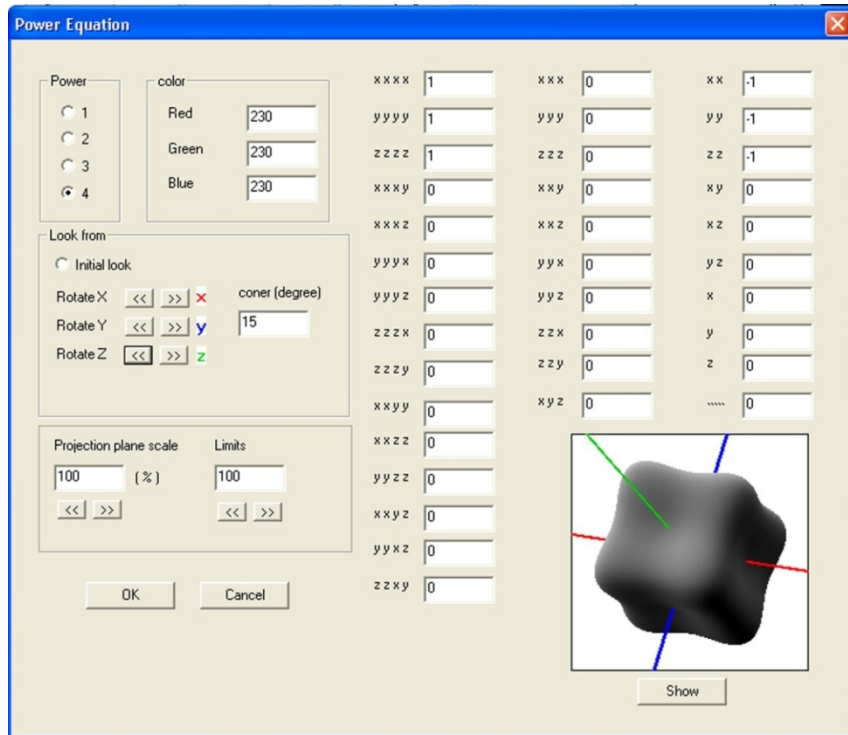
50 031 545 098 999 707

individual surfaces

A number of types of surfaces:

- 3-d degree – 59 047
- 4-ft degree – 7 782 967

$$x^4 + y^4 + z^4 - x^2 - y^2 - z^2 = 0$$



Surface «Tooth»

Method of analytical designing of new surfaces

Surface extend along one of the axes and have in each perpendicular section an ellipse

$$a_{34}x^4 + a_{19}x^3 + a_9x^2 + a_3x + a_6y^2 + a_4z^2 + a_0=0$$

If we want to have a circumference in section:

$$a_6=a_4$$

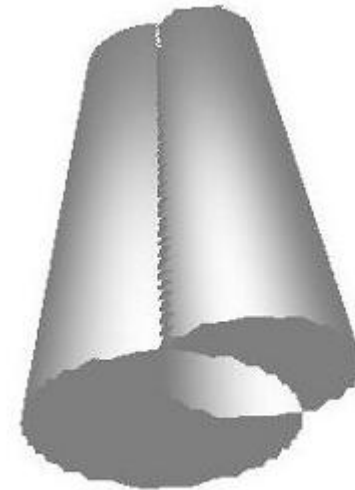
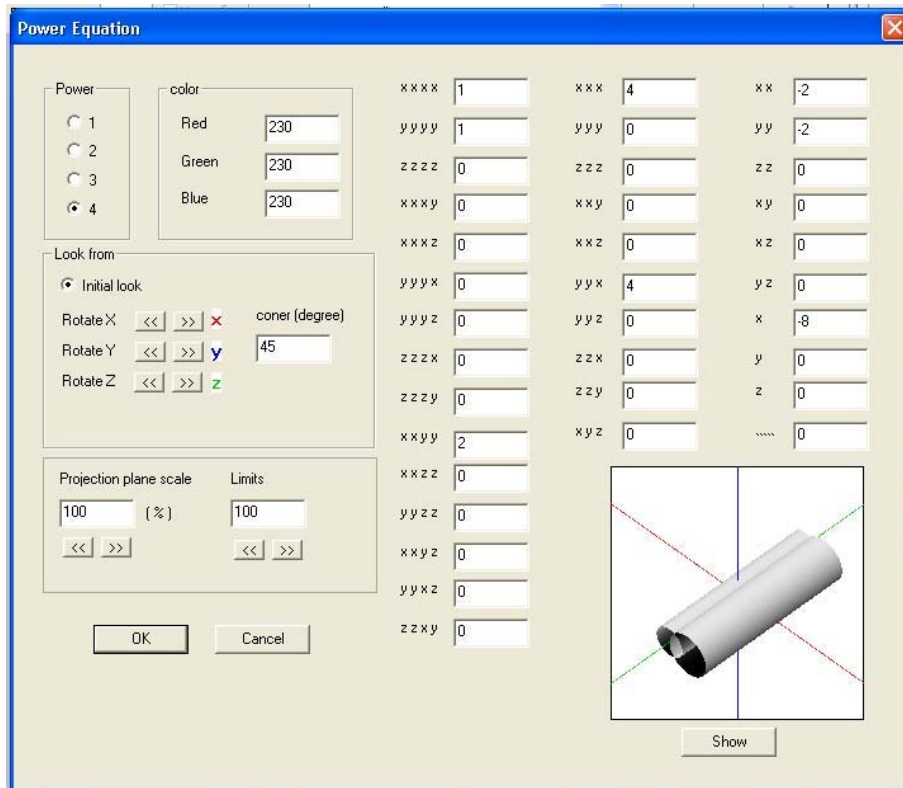
If we want to have a limited surface we need to have

$$a_4, a_6 \text{ u } a_4 \text{ of one sign}$$

Cylindrical surface:

$$a_{34}x^4 + a_{33}x^3y + a_{31}x^2y^2 + a_{28}xy^3 + a_{24}y^4 + a_{19}x^3 + a_{18}x^2y + a_{16}xy^2 + a_{13}y^3 + a_9x^2 + a_8xy + a_6y^2 + a_3x + a_2y + a_0=0.$$

$$x^4 + y^4 + 2x^2y^2 + 4x^3 + 4xy^2 - 2x^2 - 2y^2 - 8x = 0$$

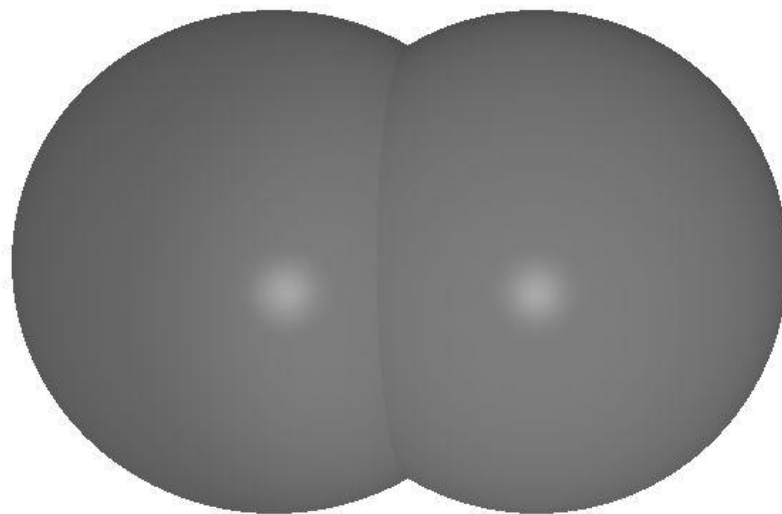
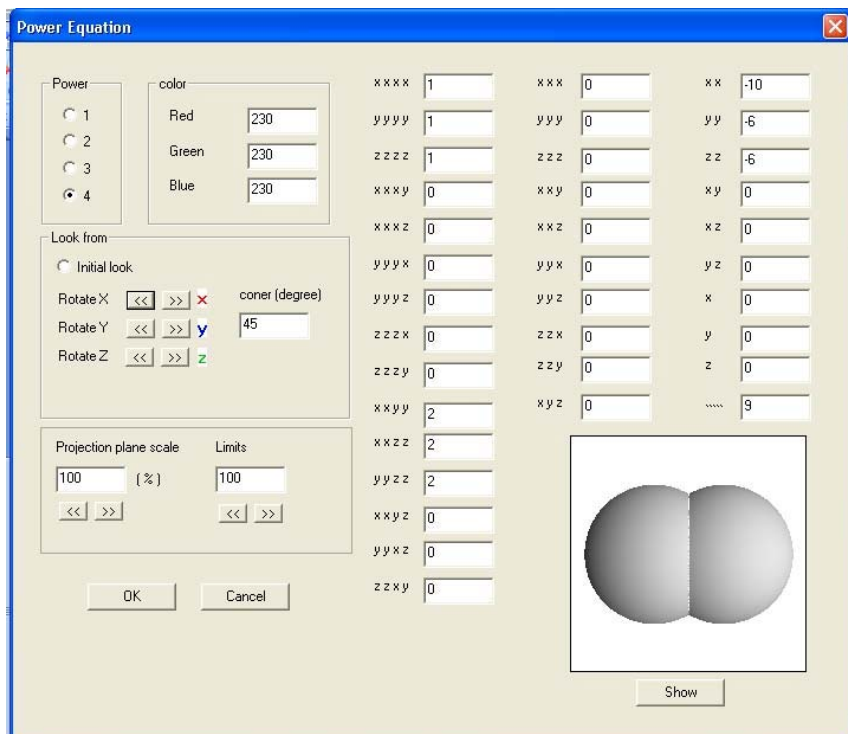


Surface «Two cylinders»

Method of updating of coefficients

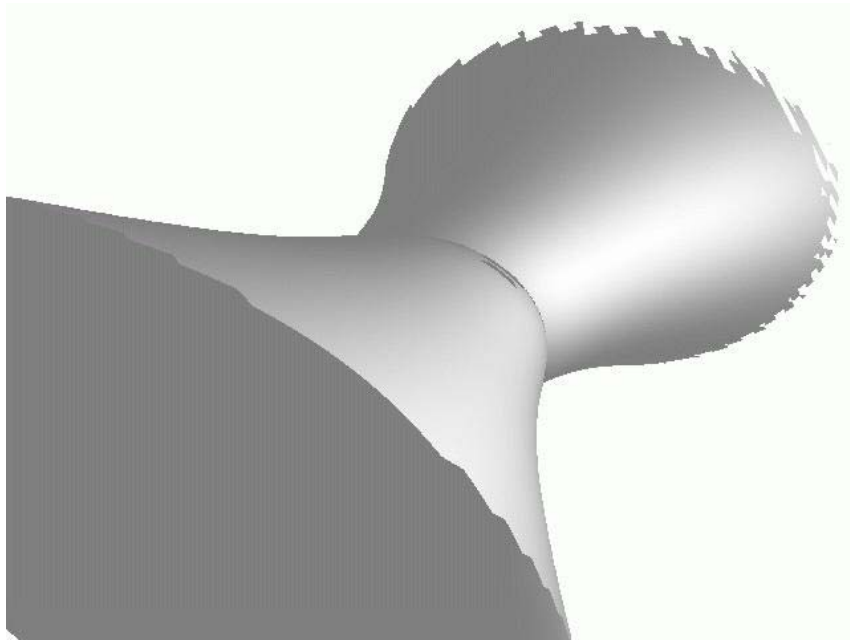
- If two previous methods have been directed on formation of types of surfaces and separate subtypes of surfaces the given method is directed on changes of a geometrical kind of surfaces at change of separate factors of the equations of initial surfaces.
- “Two spheres” can be transformed into at least 10 different shapes. These are just a lot of modifications out of those:

$$x^4 + 2x^2y^2 + 2x^2z^2 - 10x^2 + y^4 + 2y^2z^2 - 6y^2 + z^4 - 6z^2 + 9 = 0$$

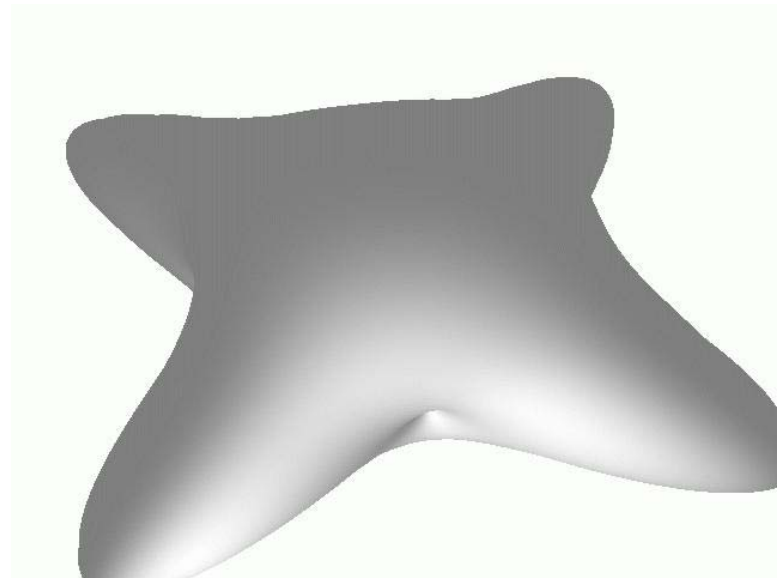


Surface «Two spheres»

$$x^4 \longrightarrow -x^4$$

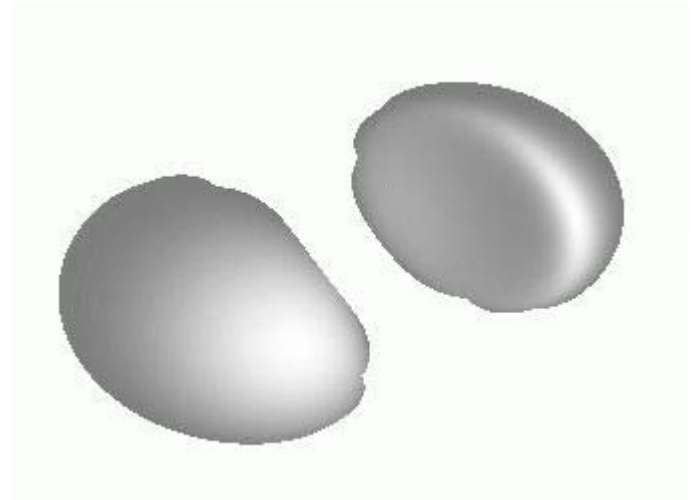
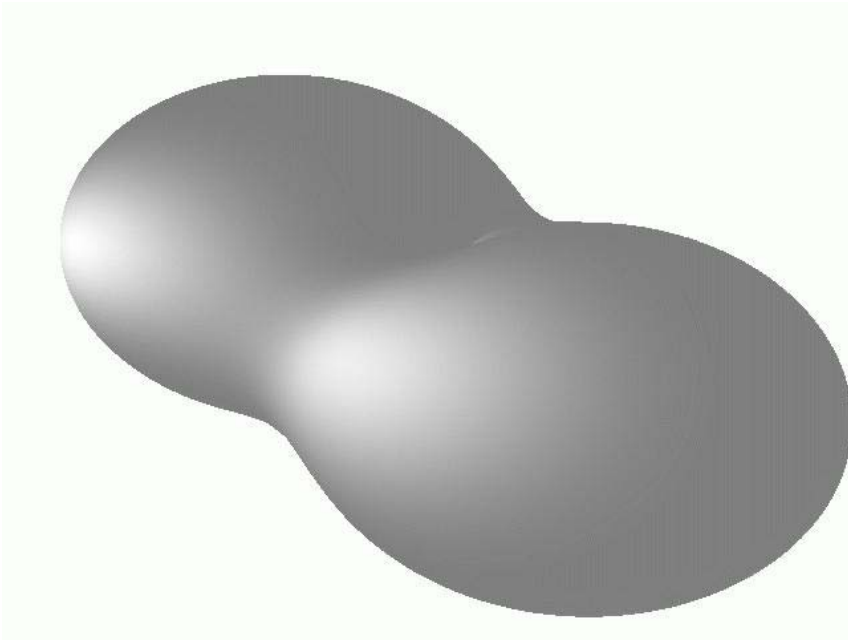


$$2x^2y^2 \longrightarrow -3x^2y^2$$

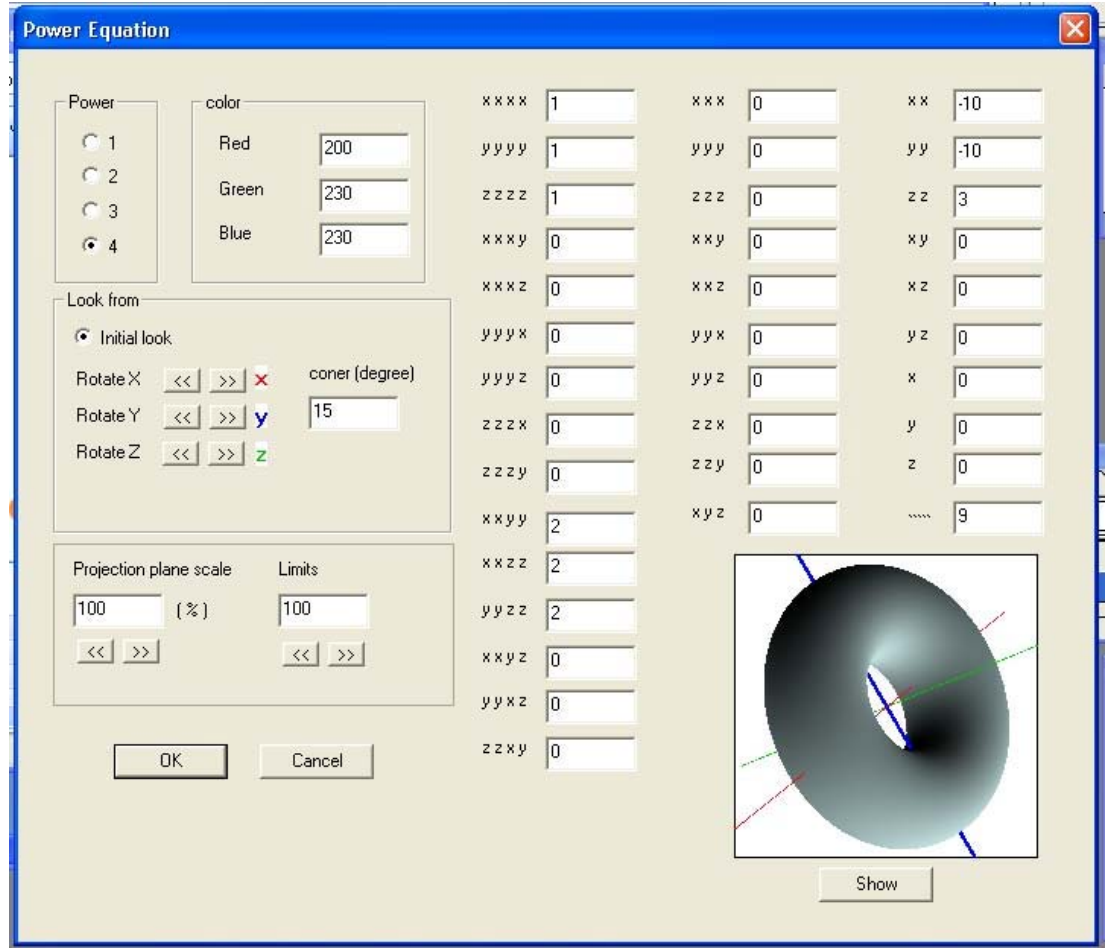
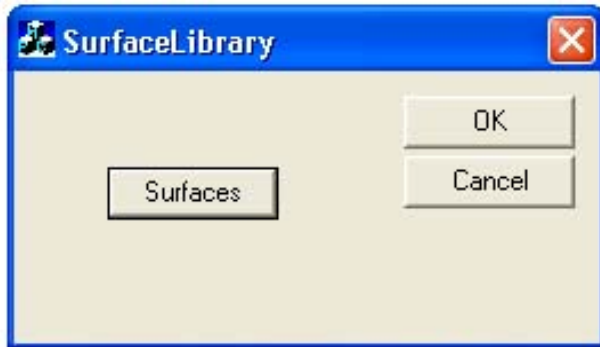


$$Y^2 \longrightarrow -34 y^2$$

$$Y^2 \longrightarrow 15Y^2$$



Surface Library



End