**Curve Decomposition**

*3-D Burmester curve*:

degree 630, 14 variables.

*Butterfly curve*:

\[ x^6 + y^6 = x^2 \]

**Method – Curves**

1. Find critical points
2. Intersect with sphere
3. Slice
4. Connect the dots
5. Merge
6. Refine

**Surface Decomposition**

*Solitude 4*:

\[ x^2 y z + y z^2 + y^2 z - x^2 z^2 = 0 \]

*Kummer 4*:

\[ x^4 + y^4 + z^4 - (y^2 z^2 + z^2 x^2 + x^2 y^2) - (x^2 + y^2 + z^2) + 1 = 0 \]

**Method – Surfaces**

1. Decompose critical curve
2. Decompose singular curves
3. Intersect with sphere
4. Slice
5. Connect the dots
6. Refine

**3D Printing**

1. Run Bertini
2. Run Bertini_real
3. Refine
4. Process into .stl
5. Thicken surface
6. Print

**References & Acknowledgements**

4. Algebraic Surface Gallery. www1-c703.uibk.ac.at/mathematik/project/bildergalerie/gallery.html

• Bertini_real relies entirely on the excellent homotopy continuation solver Bertini\(^6\) and uses isosingular deflation\(^7\) to track on singular curves.

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