Algebraic Geometry and Singularities

How to fold up space

Matt Booth

FST Forum, 15 March 2023

Algebraic geometry

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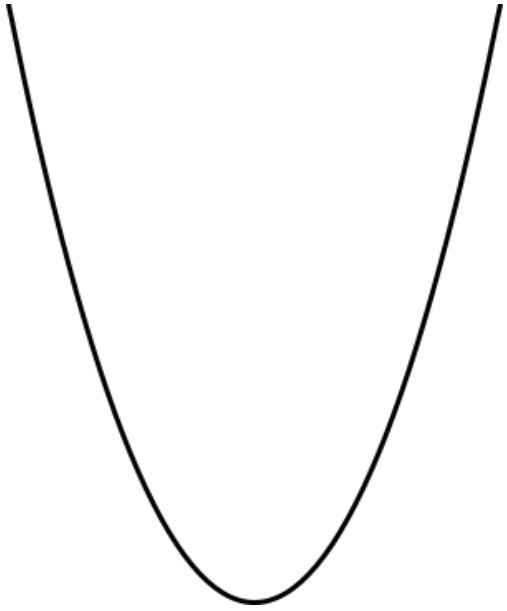
The geometry...



Algebraic geometry

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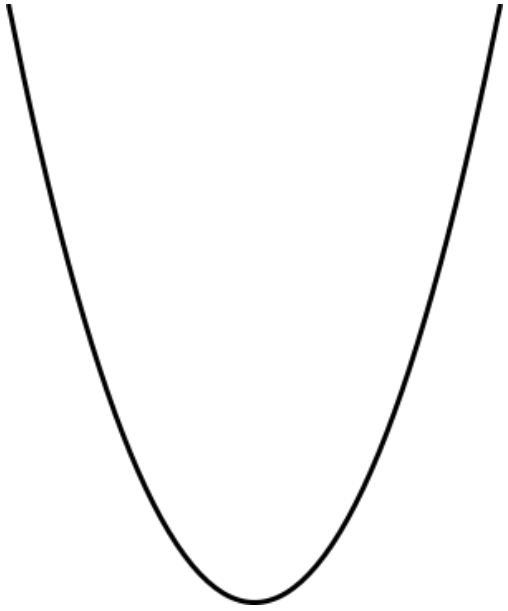
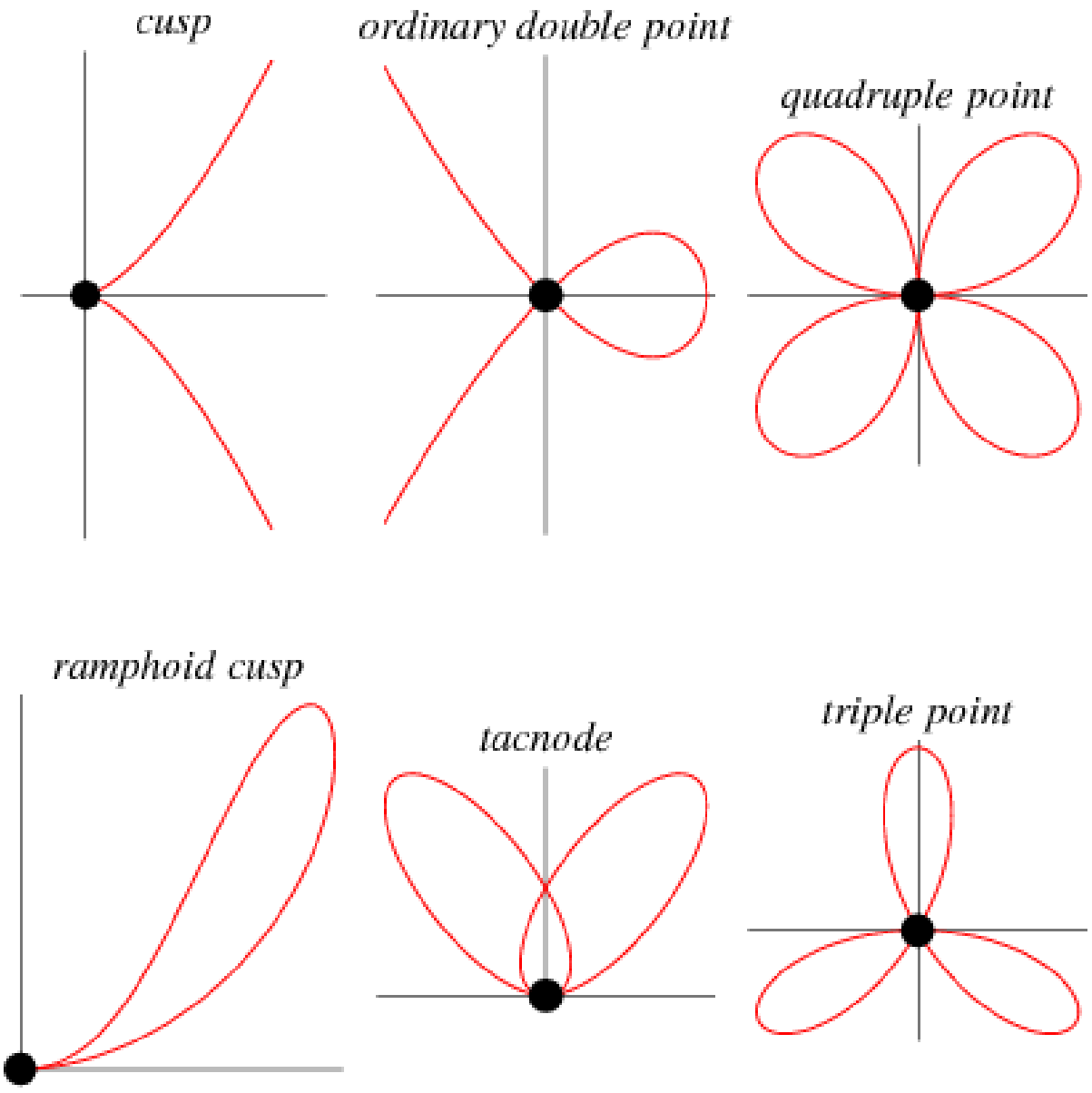


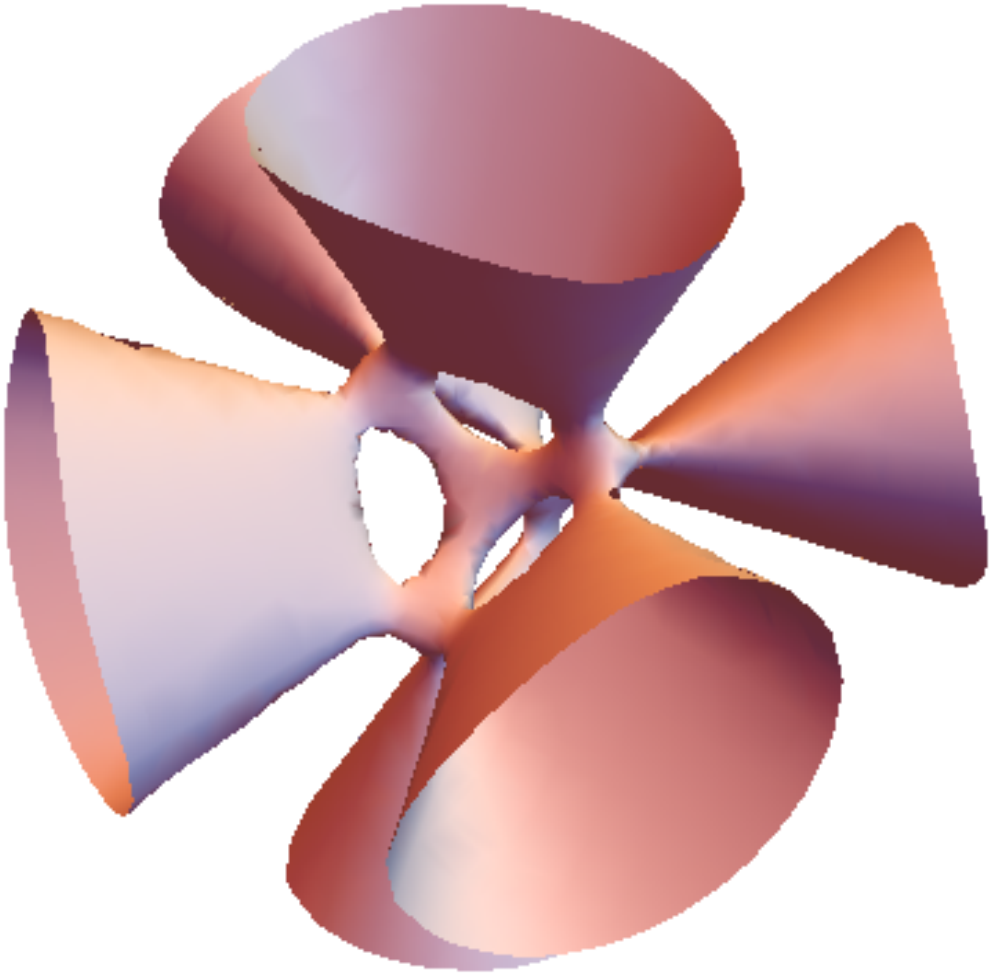
of algebraic equations

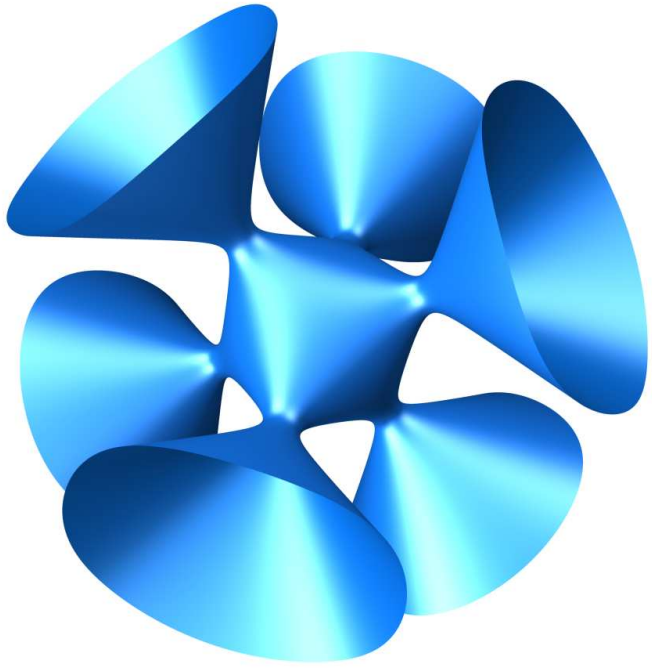
$$y = x^2$$

More curves


cusp
ordinary double point
quadruple point
ramphoid cusp
tacnode
triple point

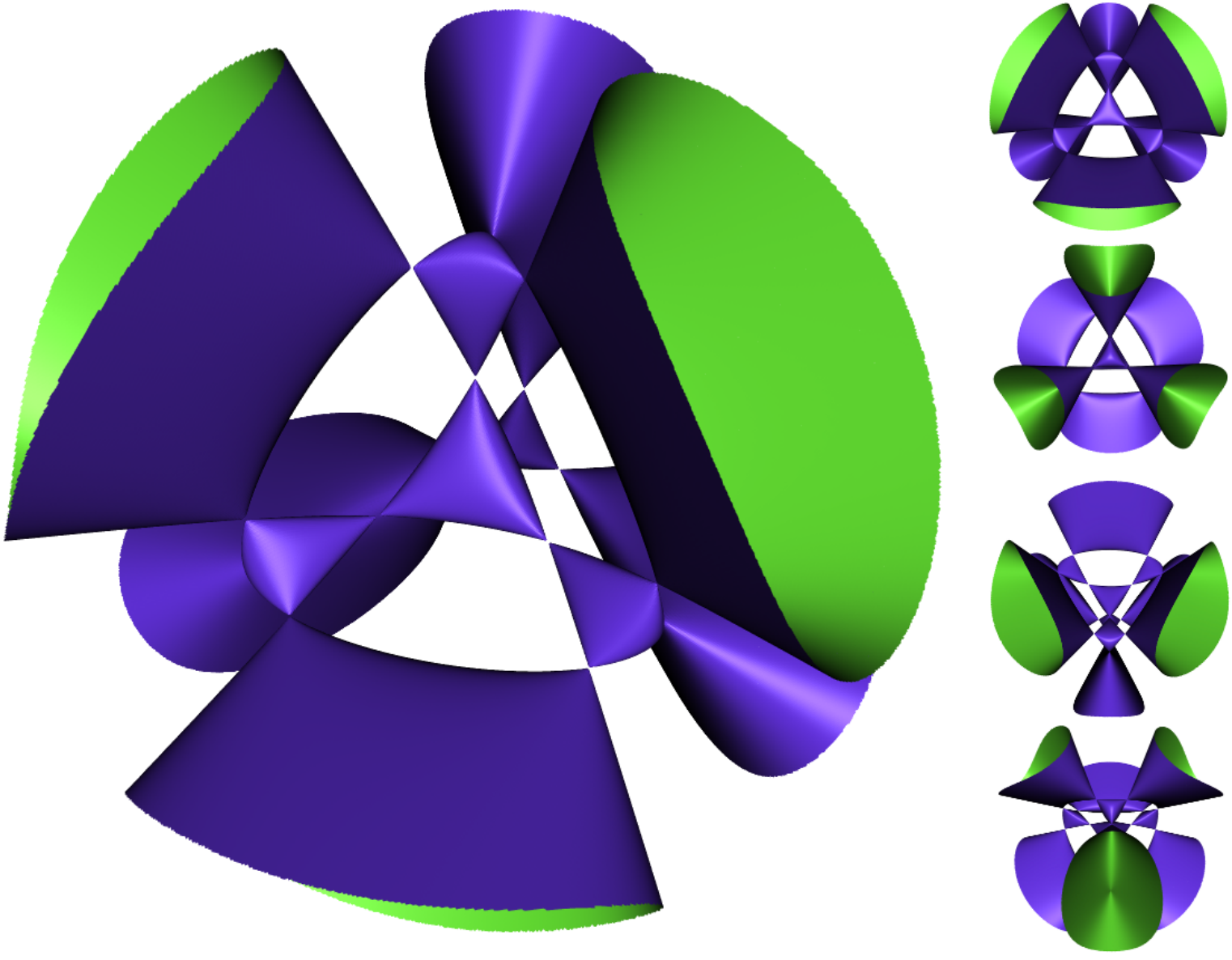
K3 surfaces





$1 + x^4 + y^4 + z^4 + a(x^2 + y^2 + z^2 + 1)^2 = 0,\ a = -0.49$

a Kummer surface



Application: Elliptic curve cryptography

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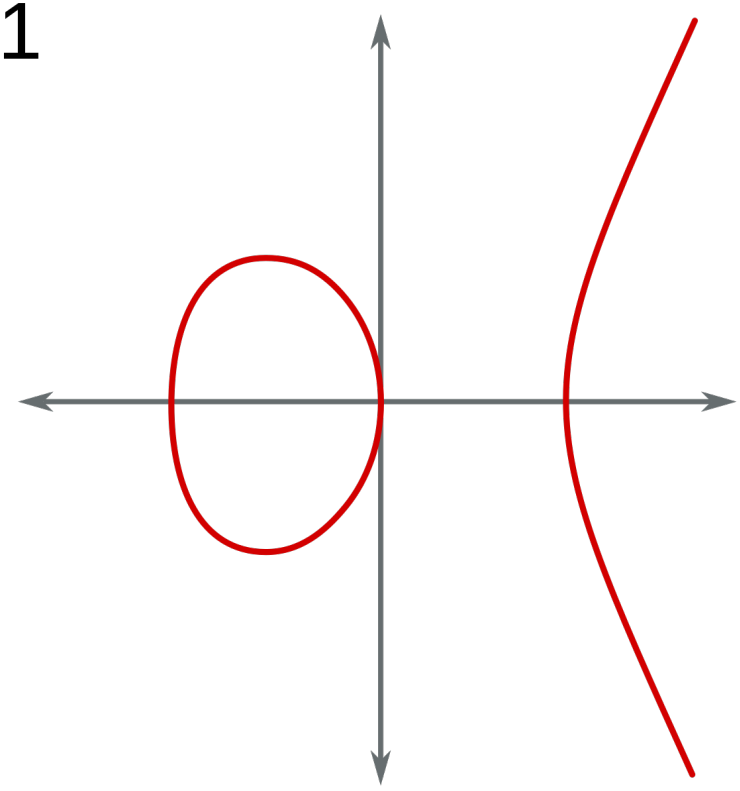
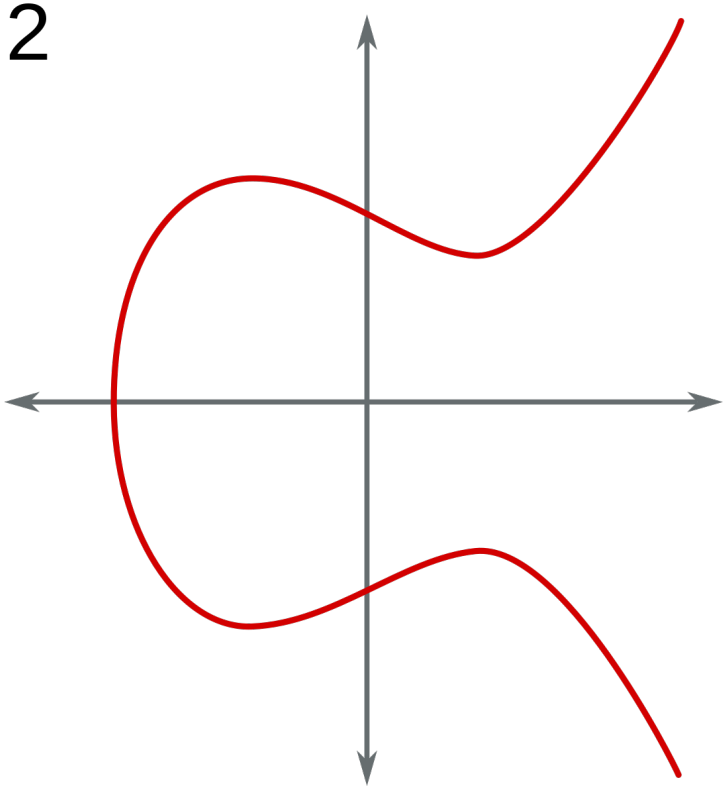
1



$y^2 = x^3 - x$

2



$y^2 = x^3 - x + 1$

Singularities

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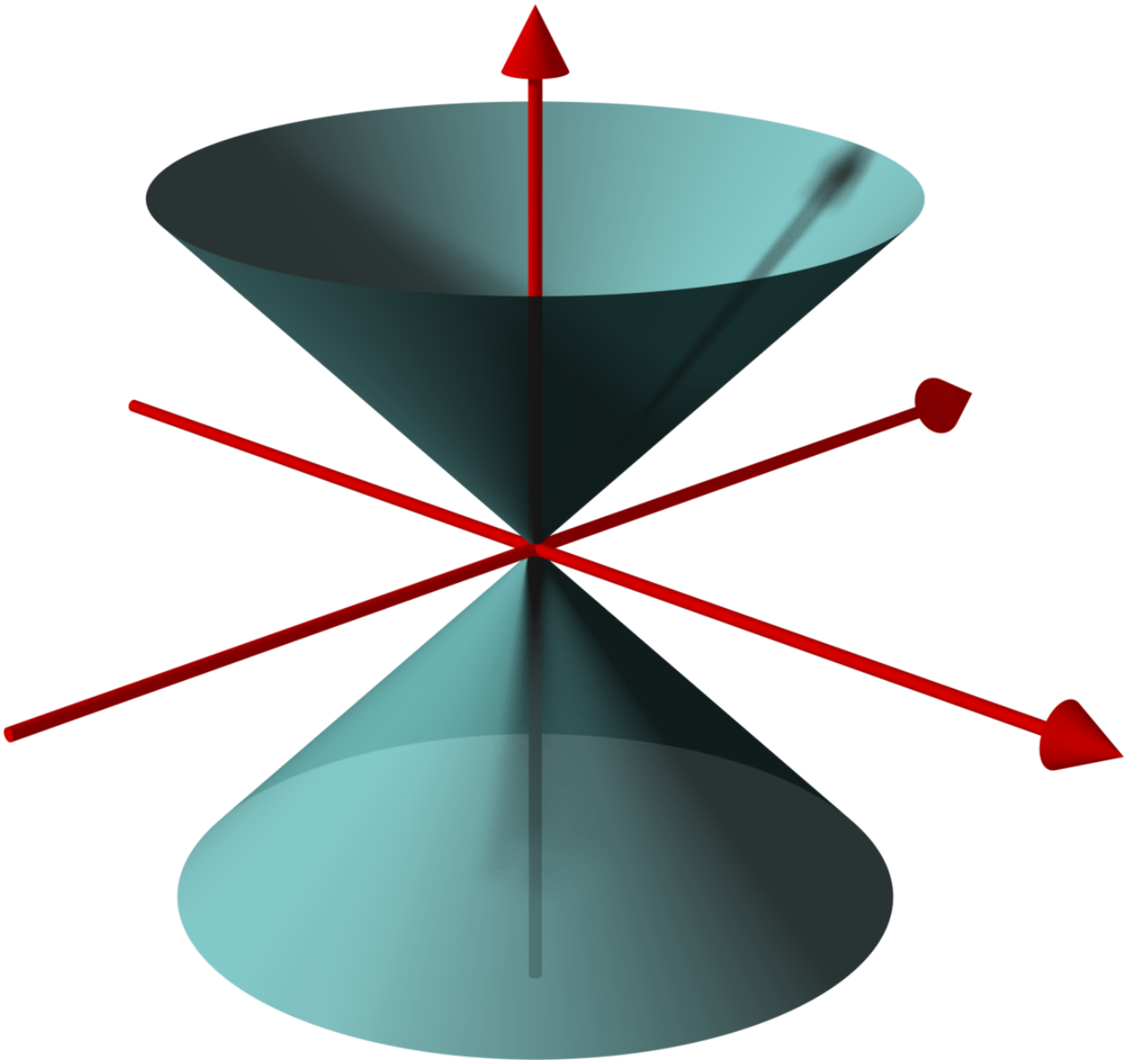
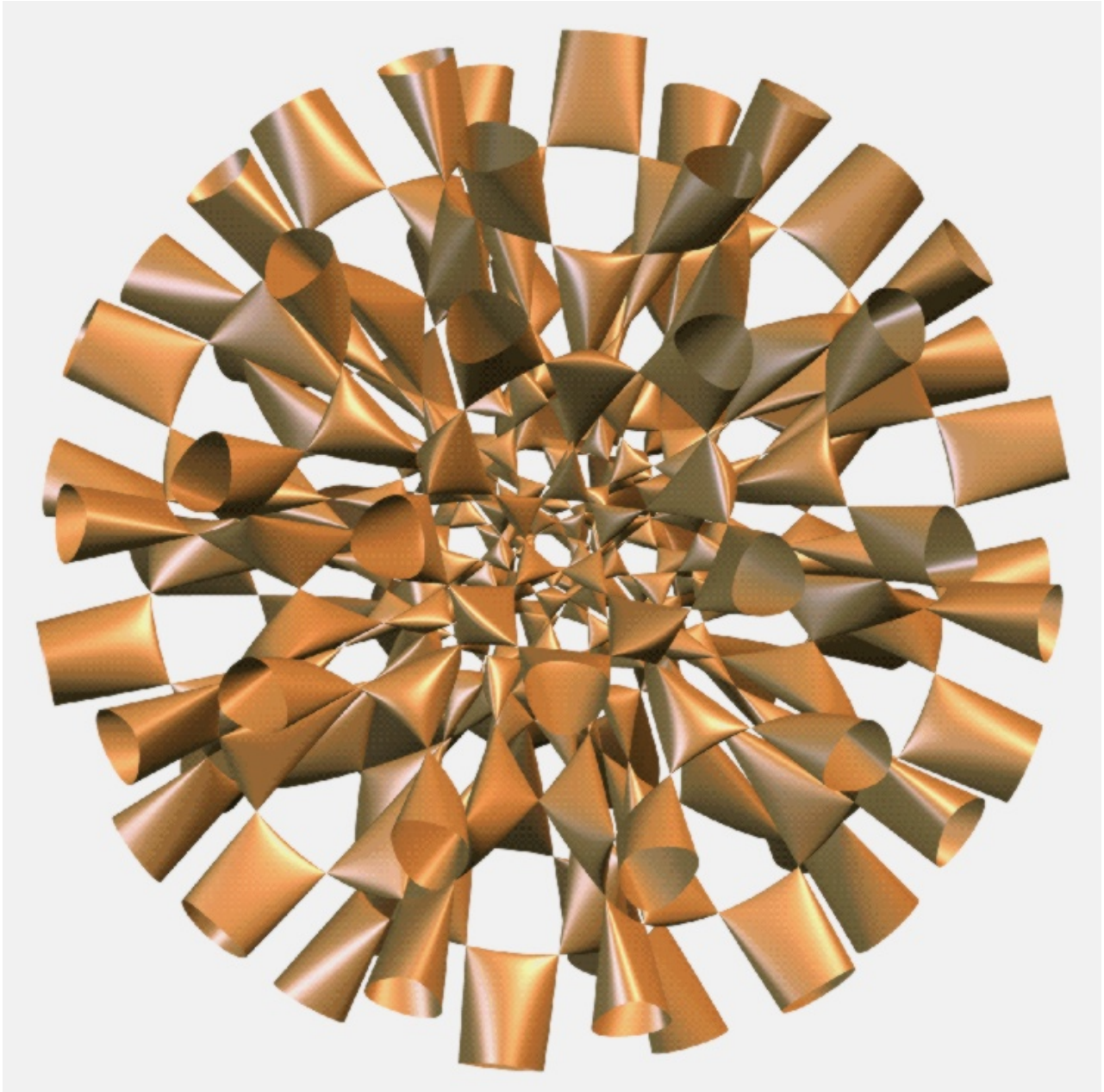
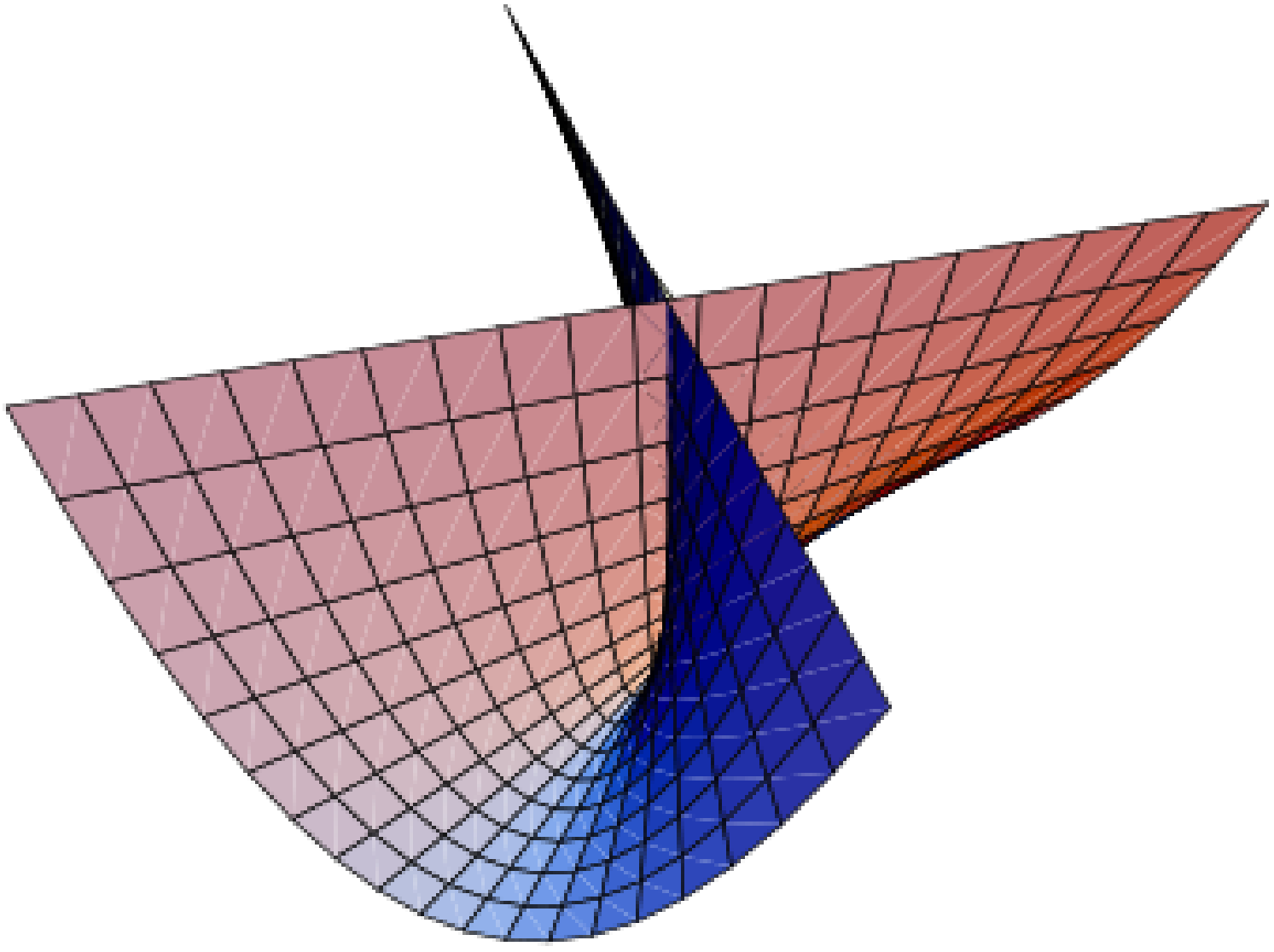


a Sarti surface



the Whitney umbrella



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- Interactions with deformation theory

Thanks for listening!