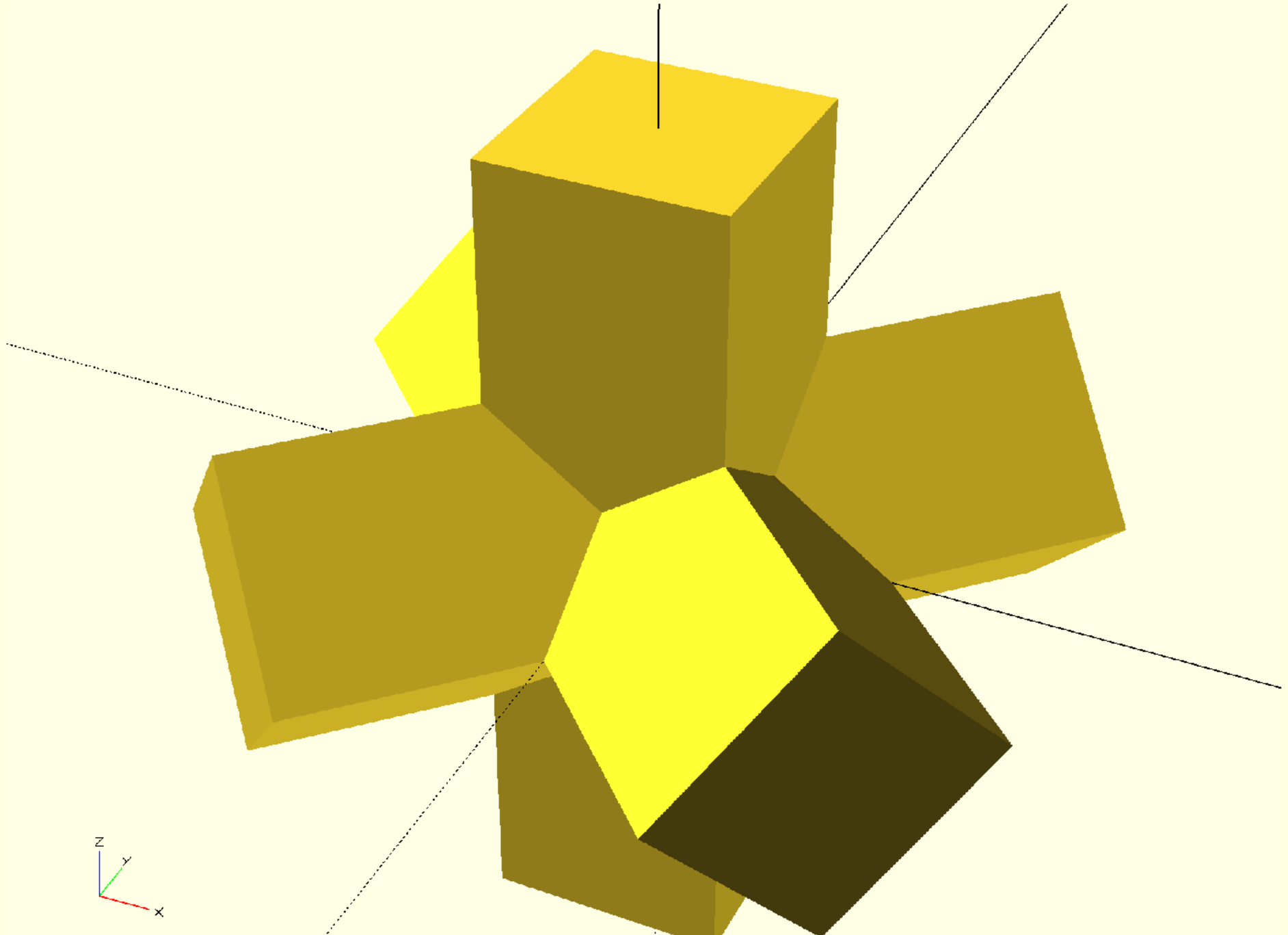
Fun with intersecting prisms

That may not sound like fun to you but I assure you that it is

Robin Houston, MathsJam 2025

Let’s start with an

Octahedron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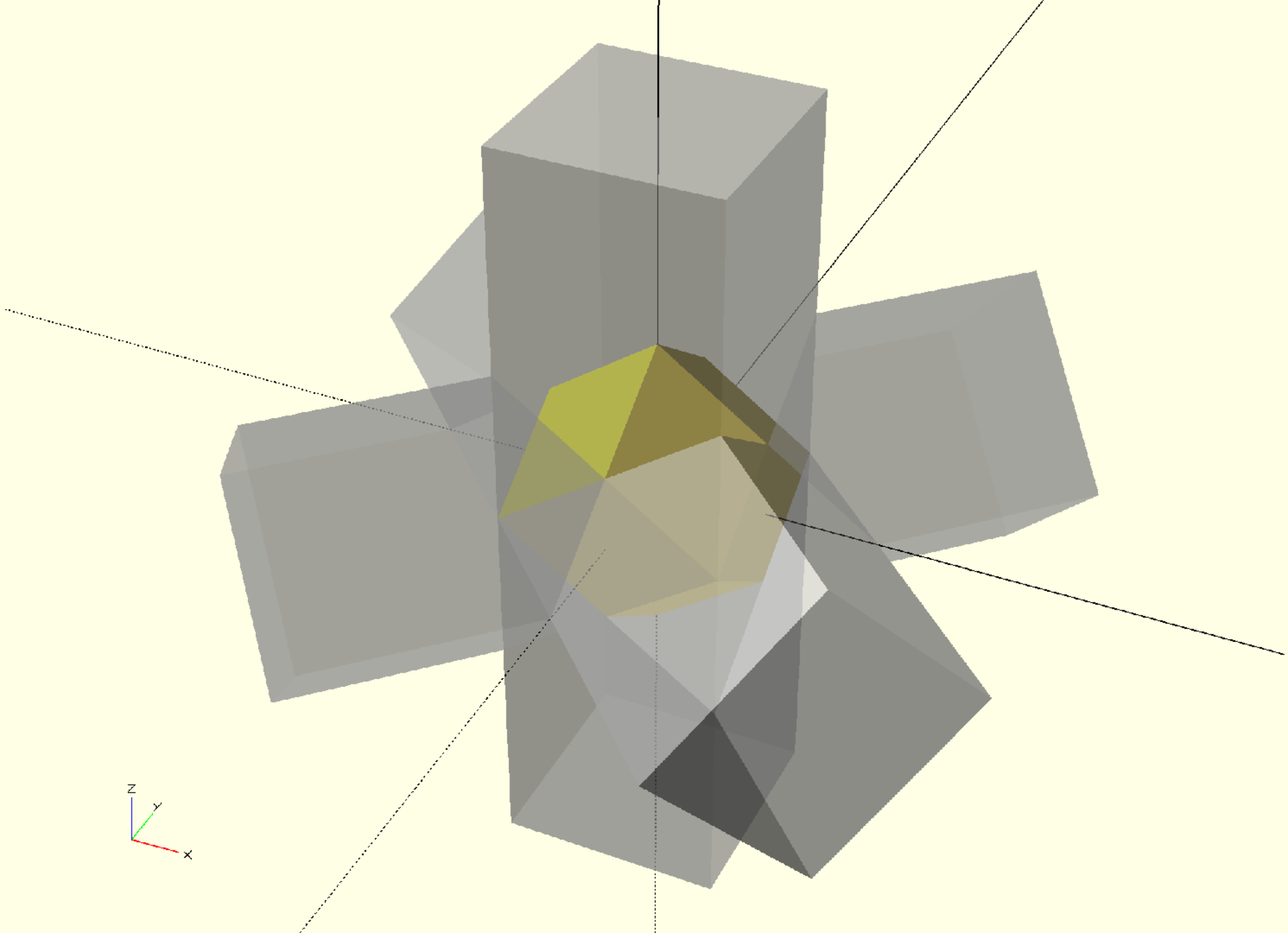
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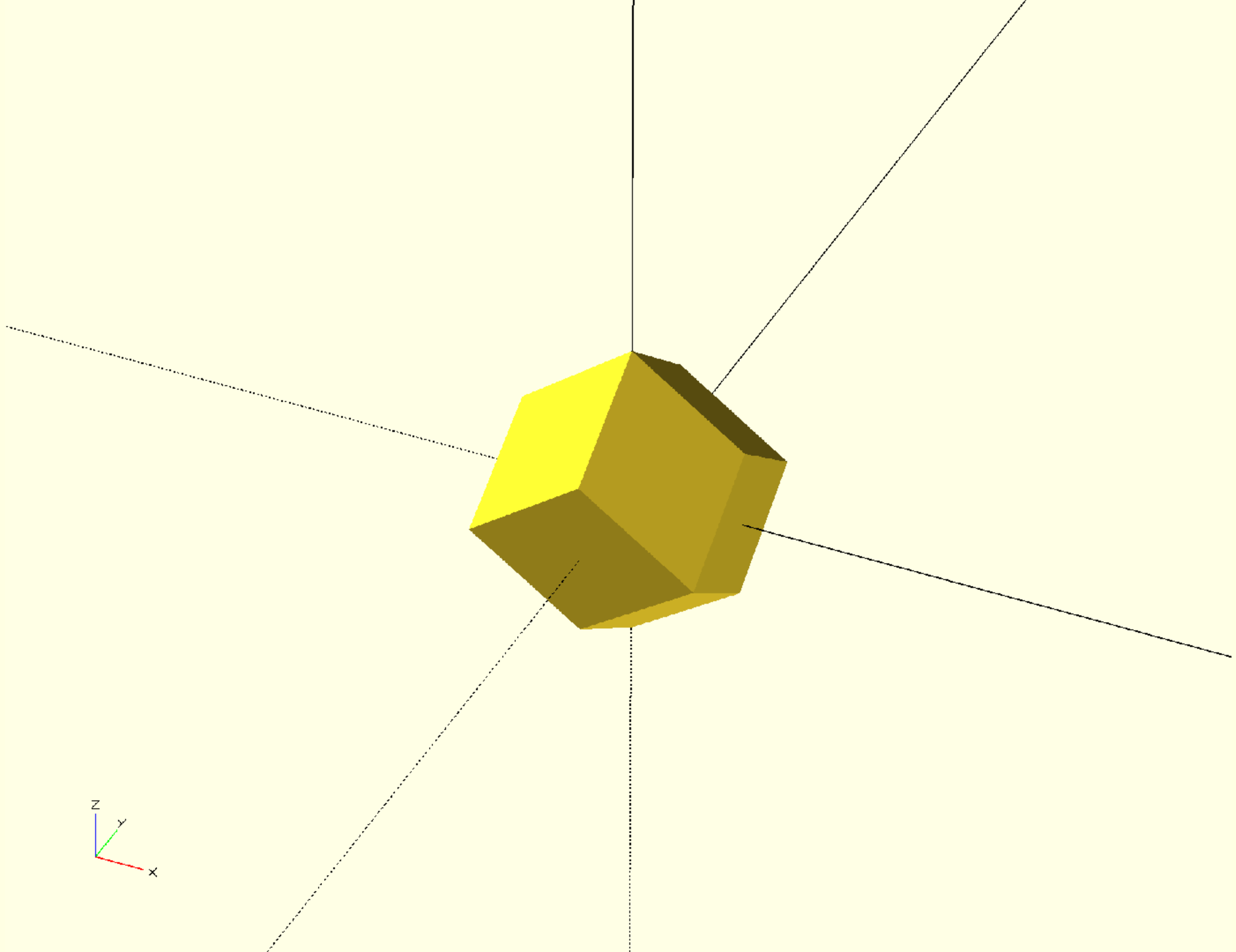
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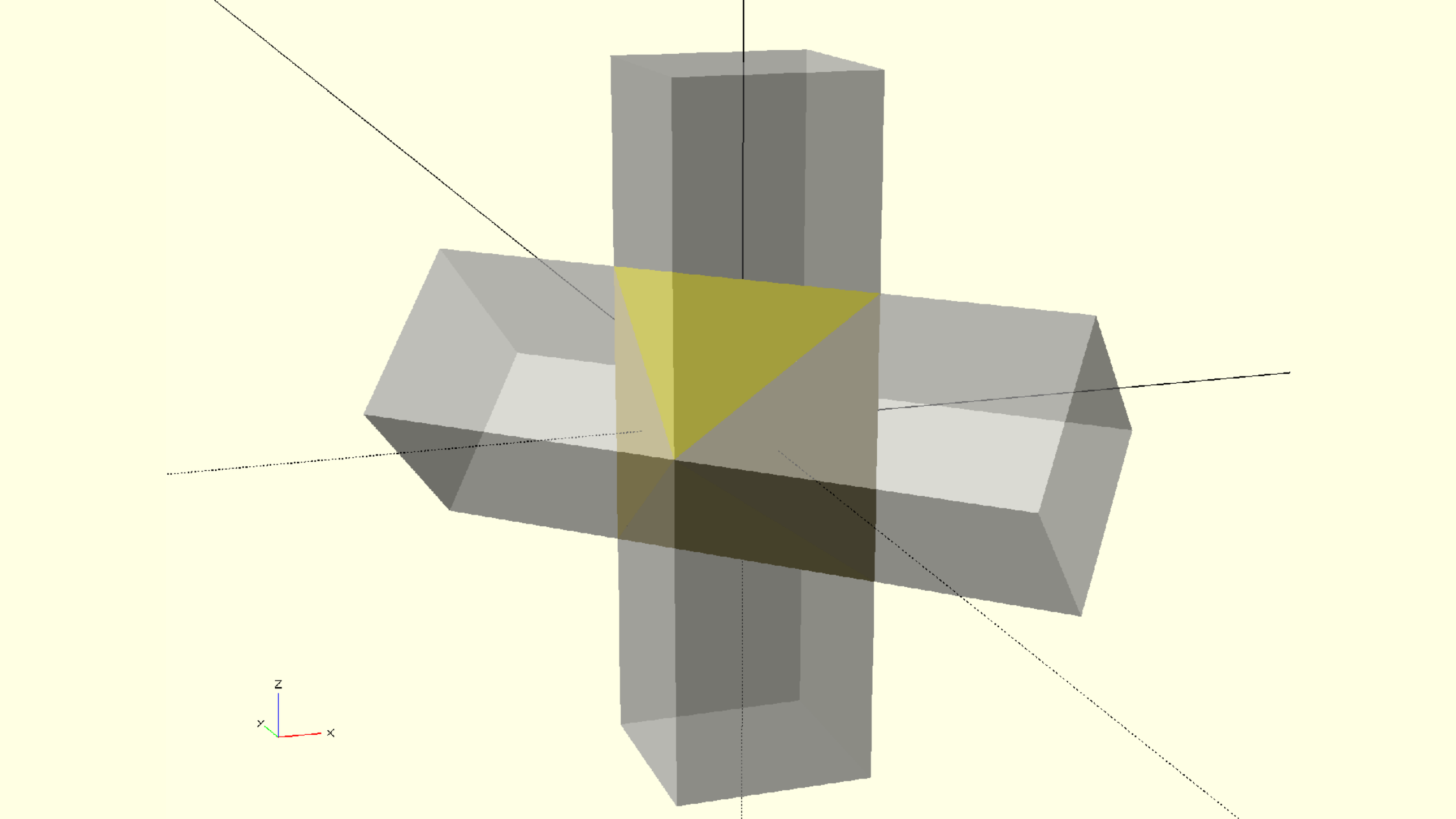
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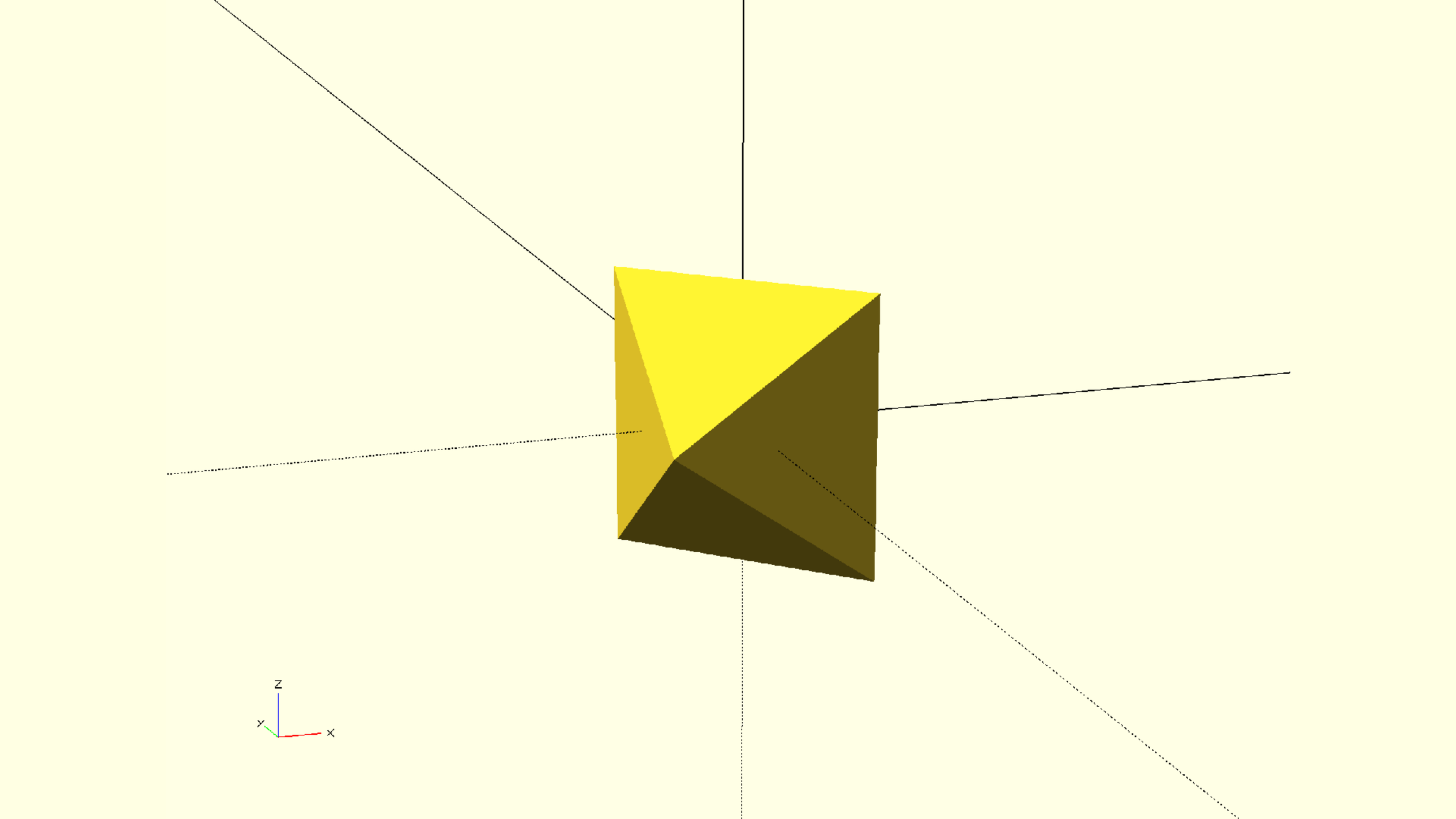
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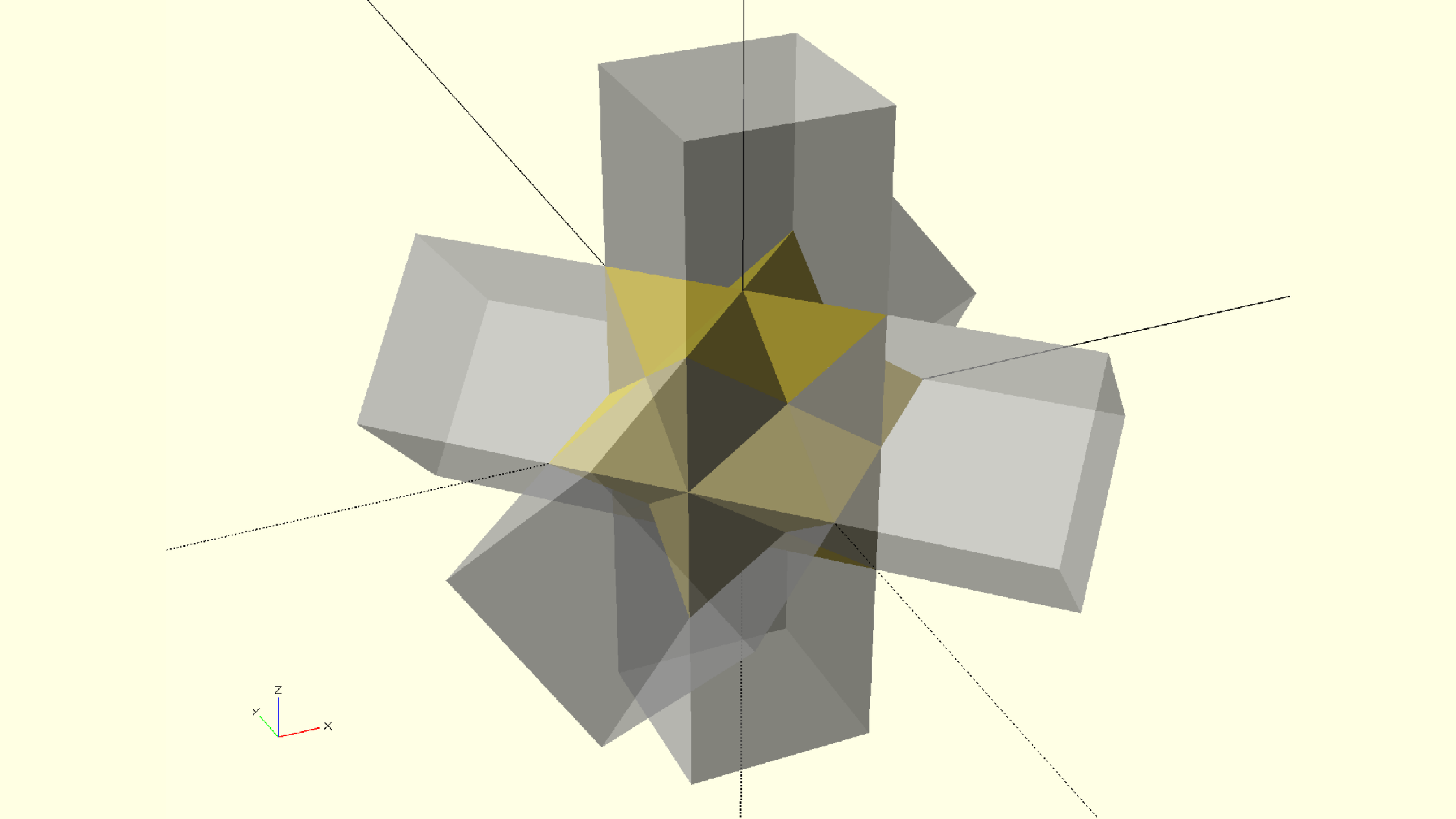
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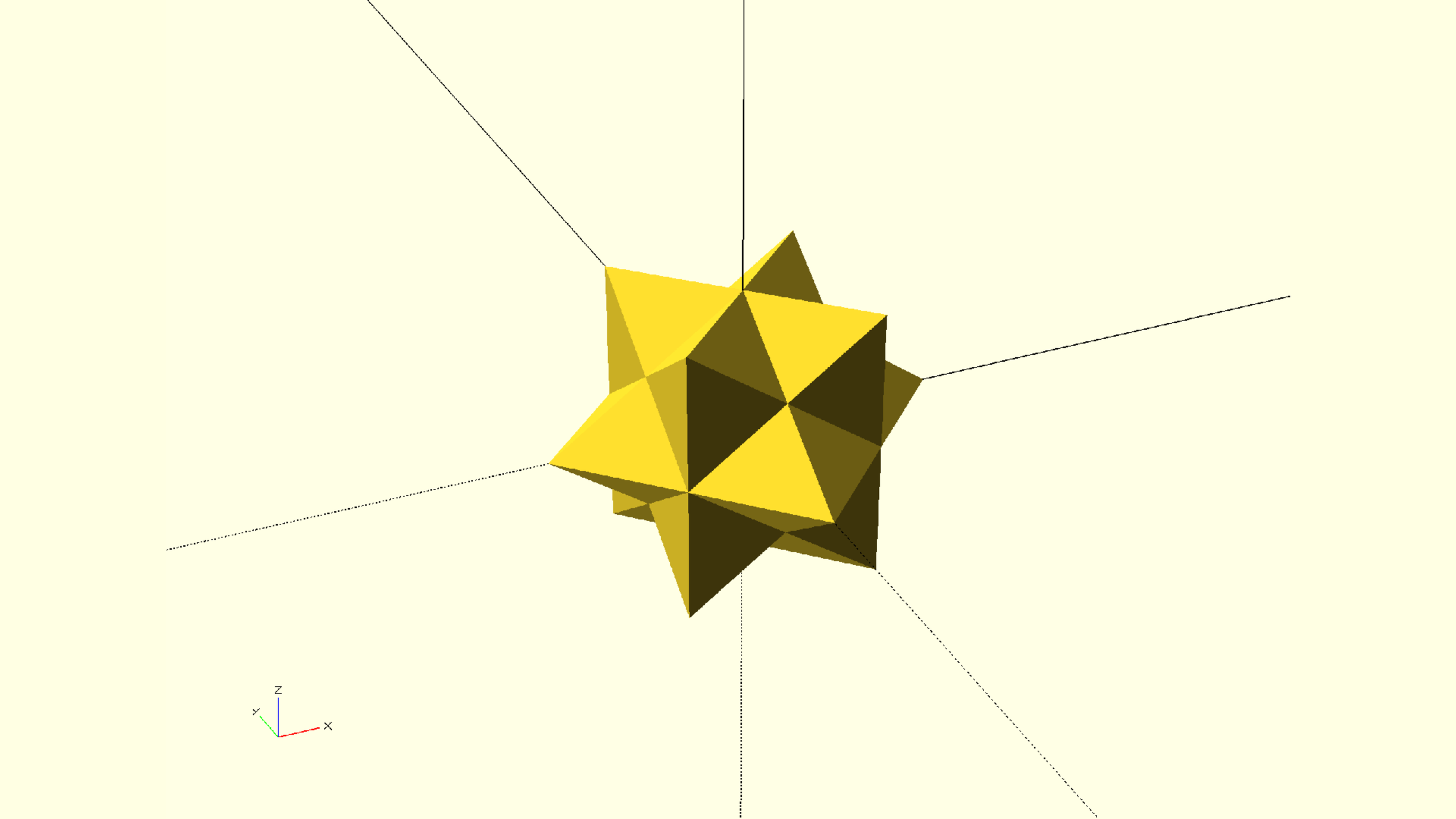
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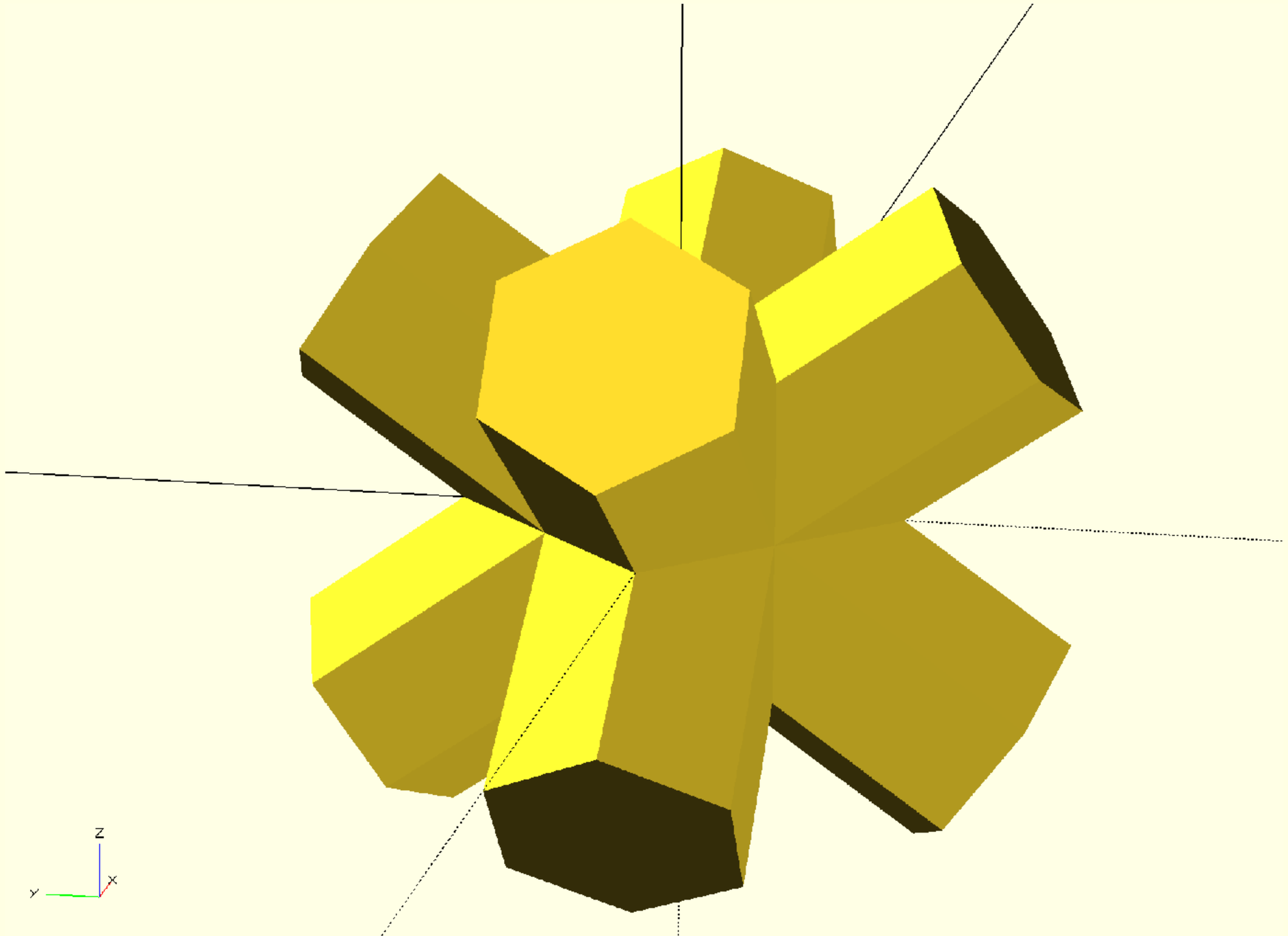
Now look at a

Cube

or look at the 3-valent vertices of the rhombic dodecahedron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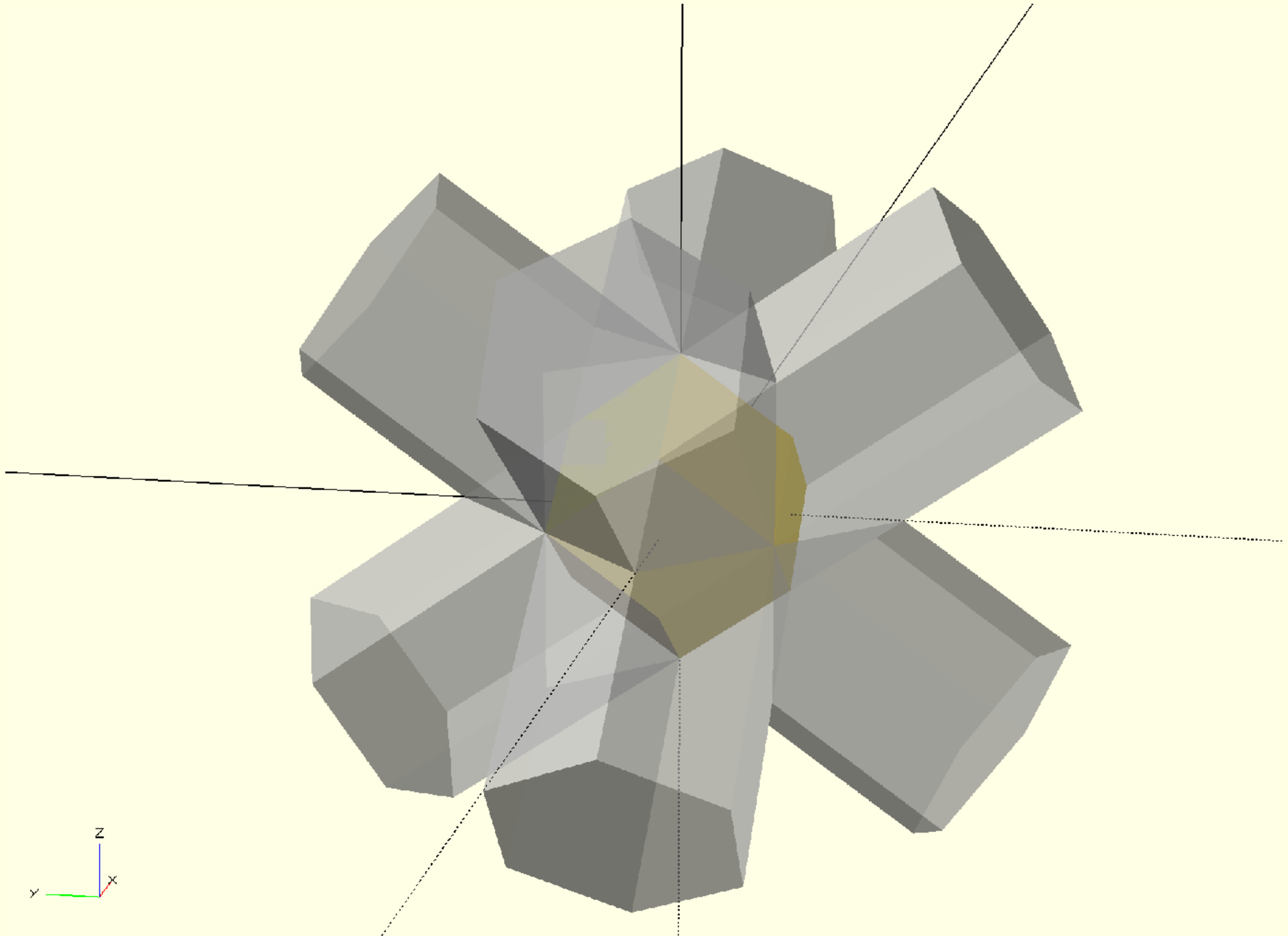
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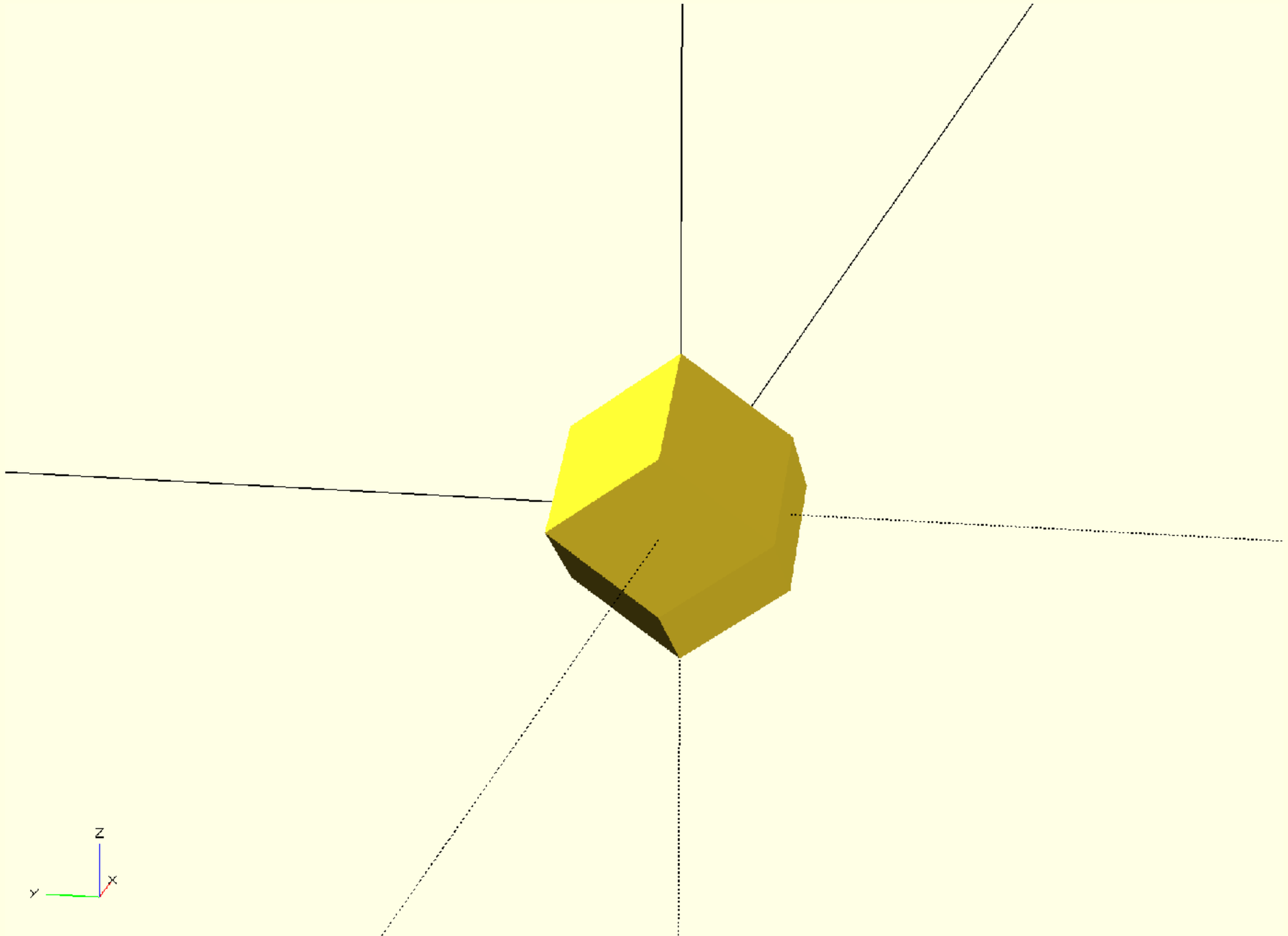
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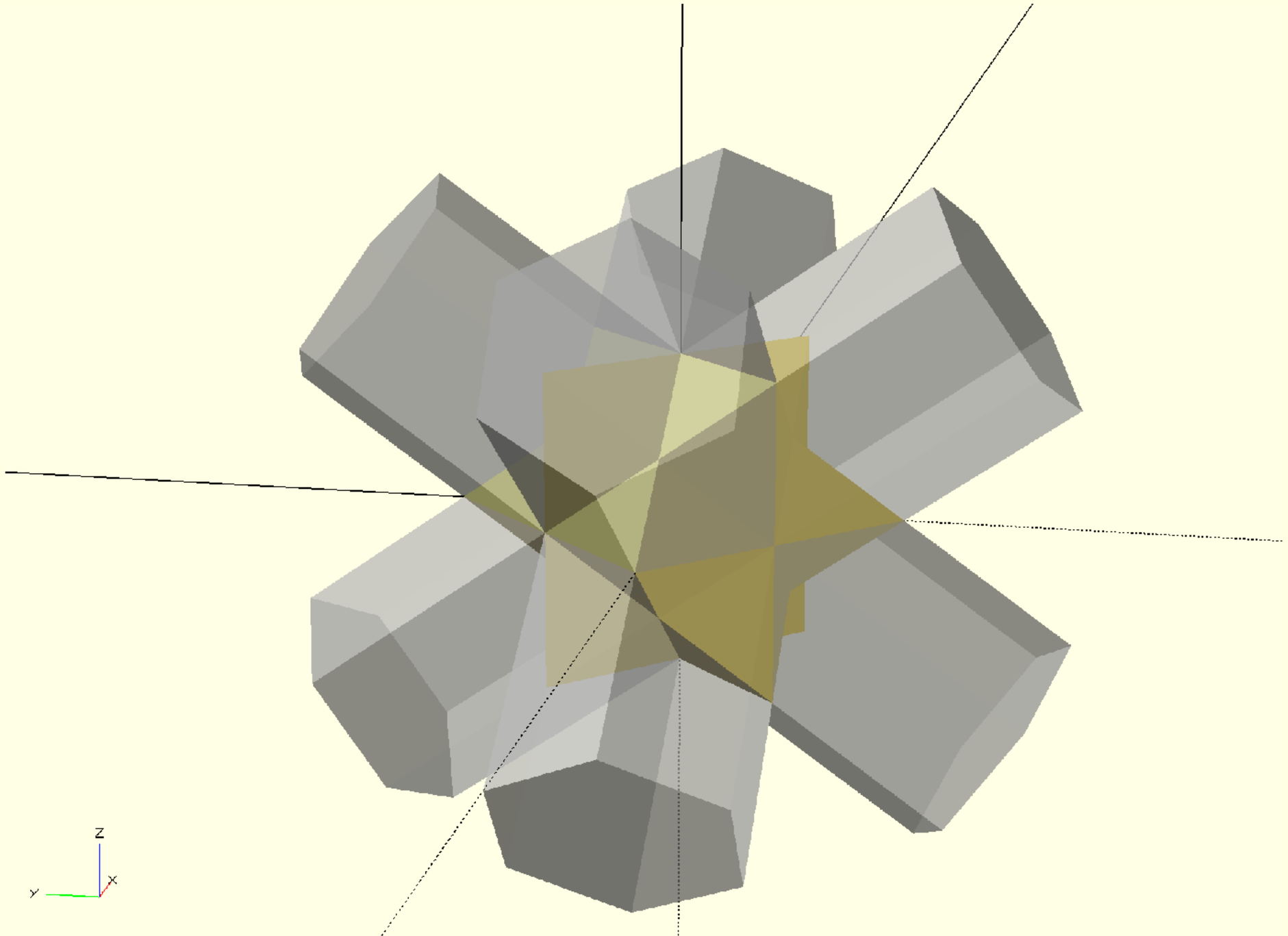
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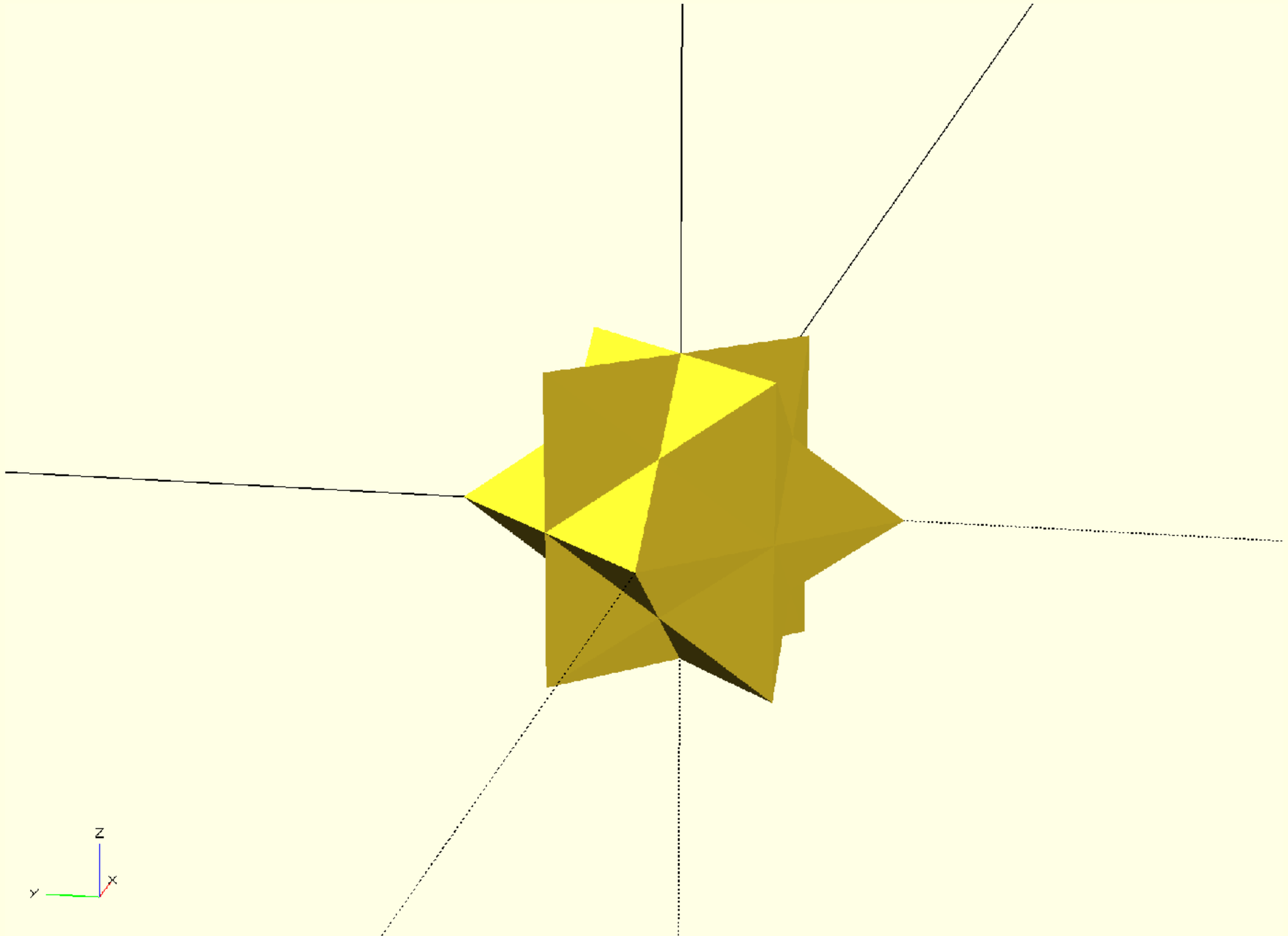
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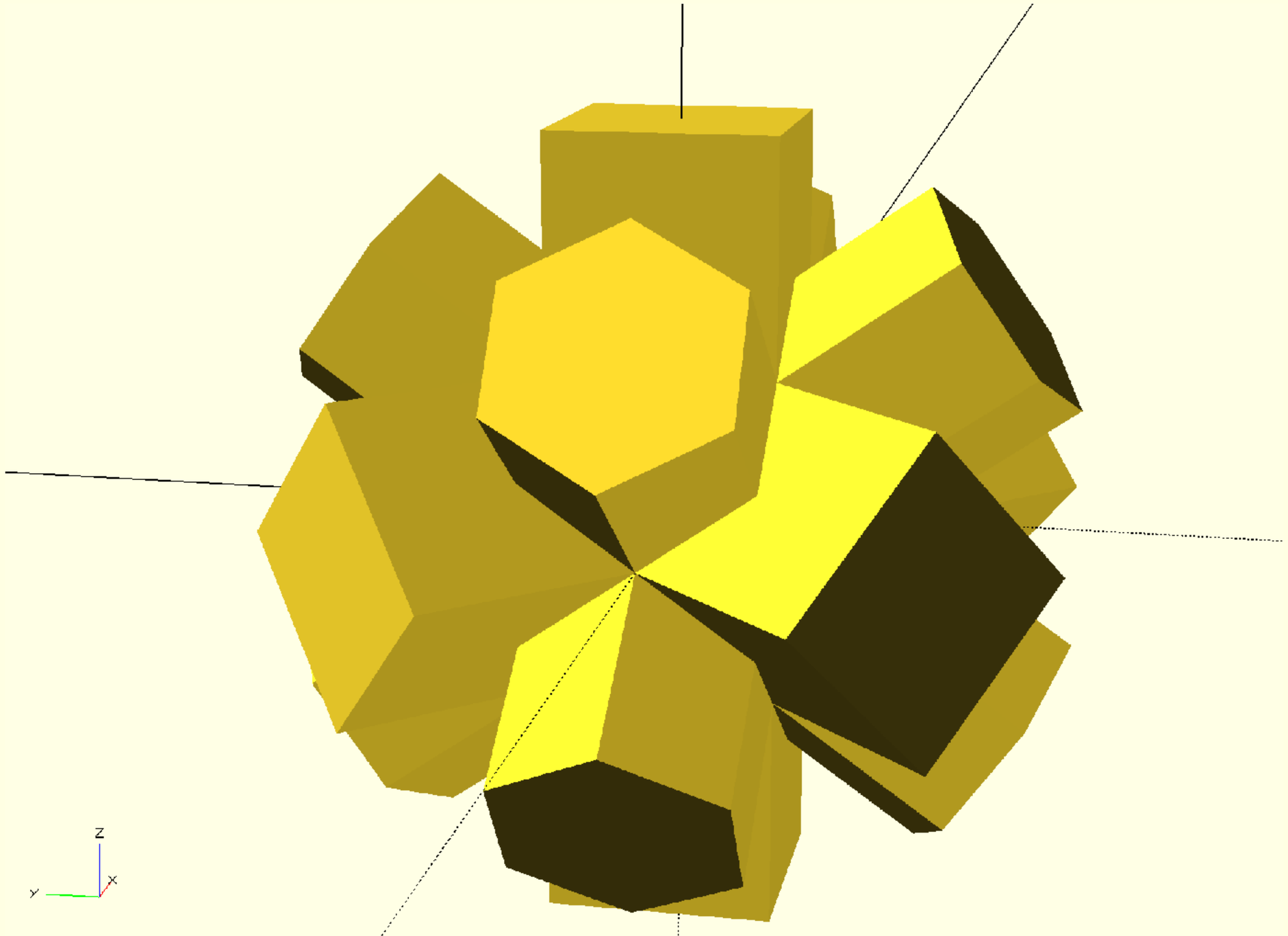
What if we put

Both together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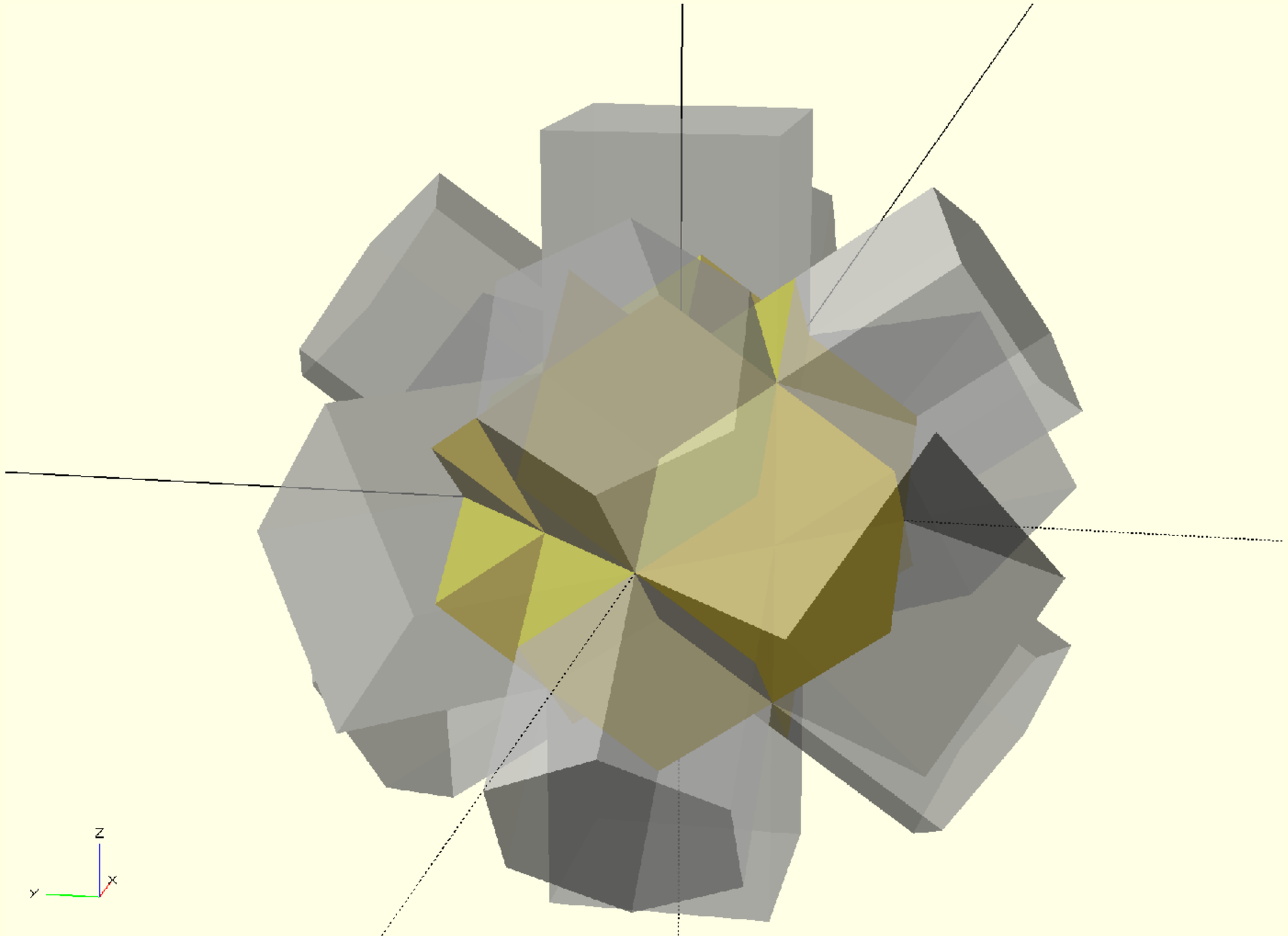
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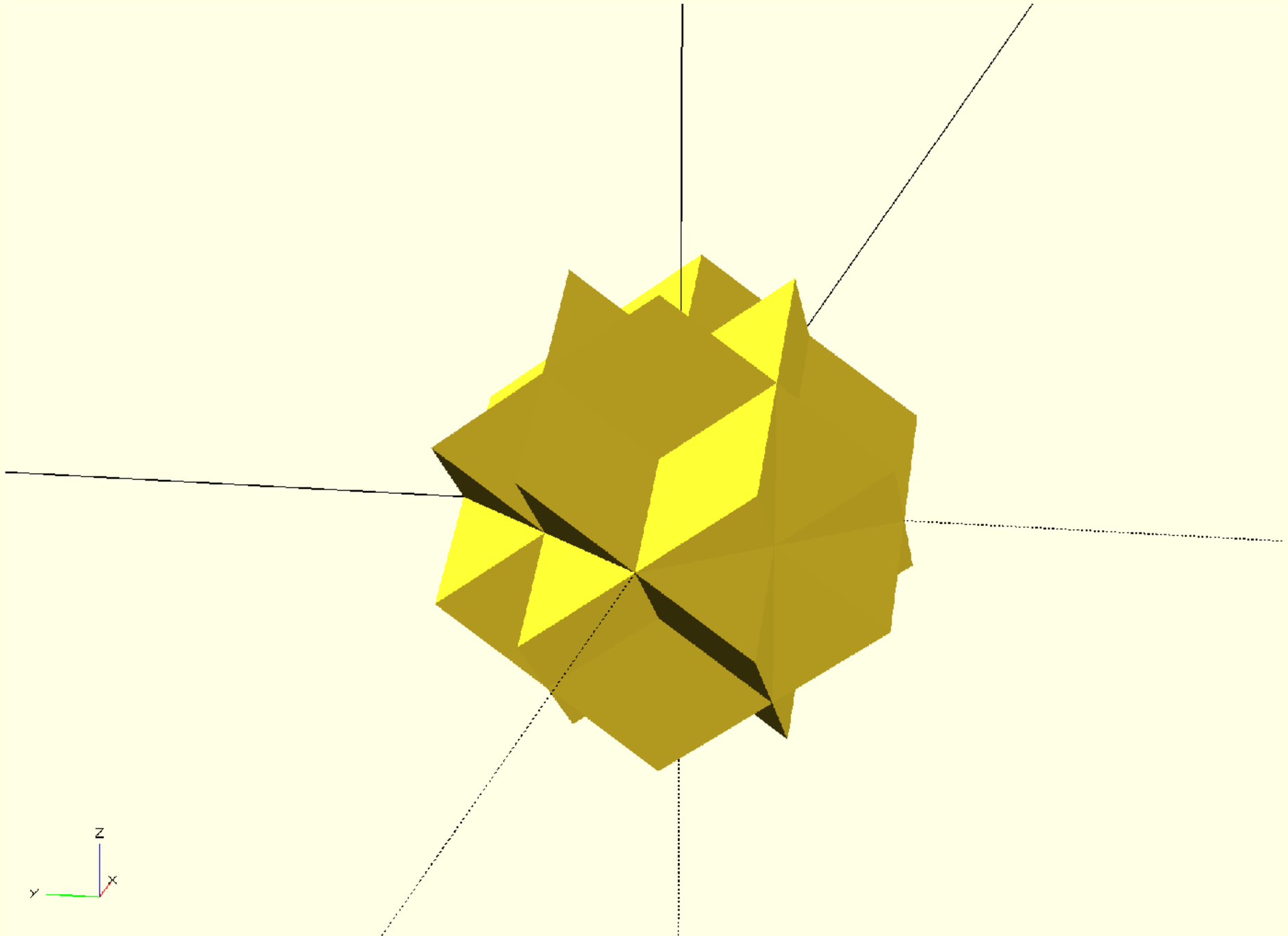
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Questions I don’t know the answer to that seem interesting to me

1. Other polyhedra

- Take your favourite centrally symmetric convex polyhedron
- Make prisms of the vertex-centred silhouettes
- What’s their intersection?
- What about intersections of subsets of them?

Questions

2. Turning polyhedra inside out

- Take your favourite centrally symmetric convex polyhedron
- Connect each face to the centre to make a pyramid
- Reflect those pyramids across the faces
- Do you get anything interesting?
- Which polyhedra give convex results when you do this?

Questions

3. Intersecting prisms more generally

- Take some infinitely-long prisms in some pleasing configuration of your choice
- What's their intersection?
- What about intersections of subsets?

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Jacob Chandler, *In Hoc Signo*

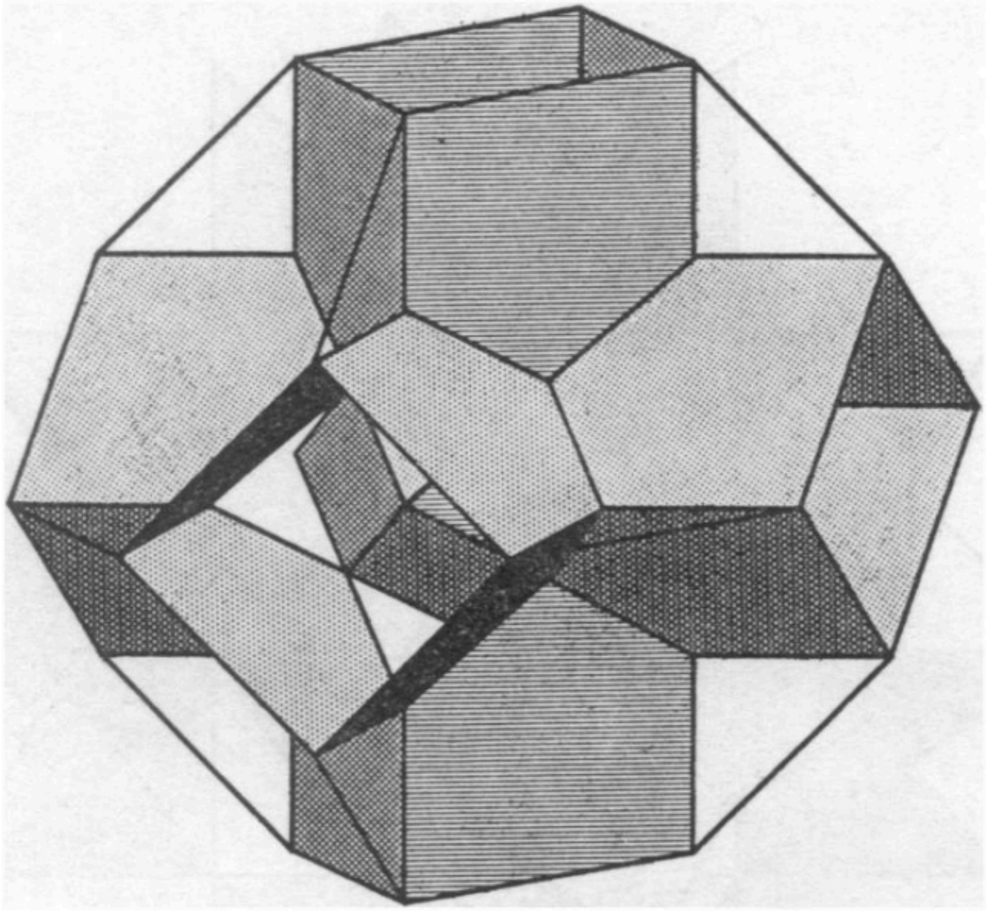

FIG. 7. Rhombic Dodecahedron encased in three square prisms.

Stellations of the Rhombic Dodecahedron, by Dorman Luke
The Mathematical Gazette, Vol. 41, No. 337 (Oct., 1957), pp. 189-194