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Triangulation

Tetrahedralization

- Polyhedron Decomposition

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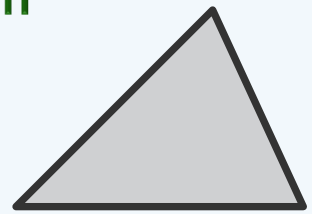
3D Triangulation

❖ A **general triangulation** of a geometric domain is

a partition into **simplices** that meet only at shared faces

1) The geometric domain may be a point set, a polygon, or a polyhedron

2) The simplex in $\mathbb{R}^2$ is a triangle, while in $\mathbb{R}^3$ a tetrahedron

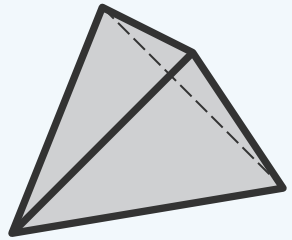


❖ 3D Triangulation = Tetrahedralization

❖ The decomposition of a polyhedron

into a set of non-overlapping tetrahedra, if exists,

is called a **tetrahedralization**

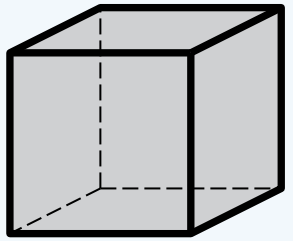


Number of Tetrahedra

- We've seen that

  every triangulation of a simple n-gon (without holes)

  consists of $n - 2$ triangles

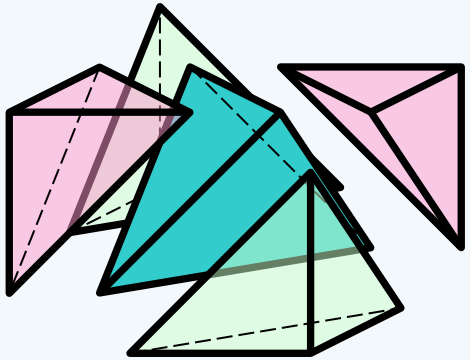


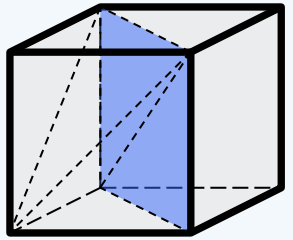
- Given an n-vertex polyhedron,

  is the number of tetrahedra

  an invariant

  of all its tetrahedralizations (if exist)?





A cube can be triangulated into 5 or 6 non-overlapping tetrahedra

- Uncertainty!