Volume function for character varieties

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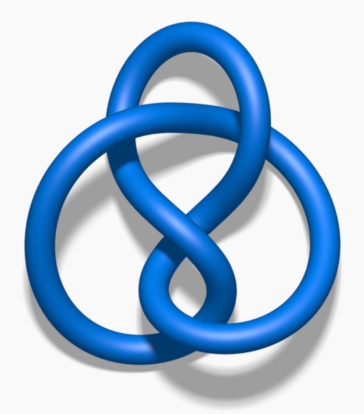
8-knot complement



The 8-knot complement M_8.

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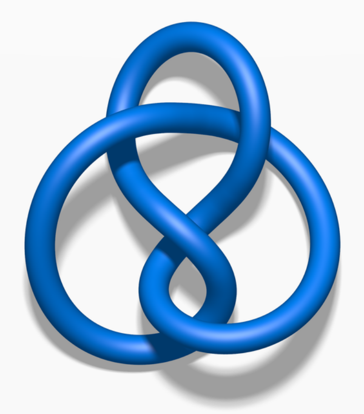
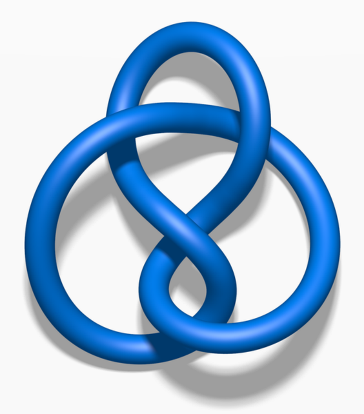


The 8-knot complement M_8.
Its fundamental group is $\Gamma_8 = \langle\ a, b \mid\ ab^3ab^{-1}a^{-2}b^{-1}\ \rangle$.

Peripheral torus



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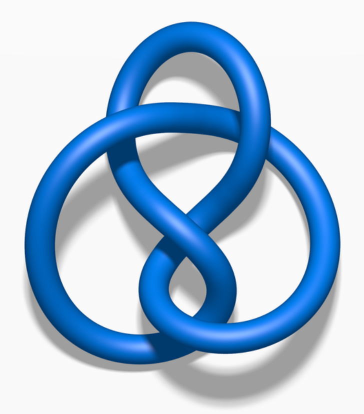

The peripheral torus has a fundamental group $\mathbf{Z}^2$. There is an injection $\mathbf{Z}^2 \to \Gamma_8$, whose image is generated by $m = ab$ and $l = aba^{-1}b^{-1}ab^{-1}a^{-1}b$.

Triangulation of M_8

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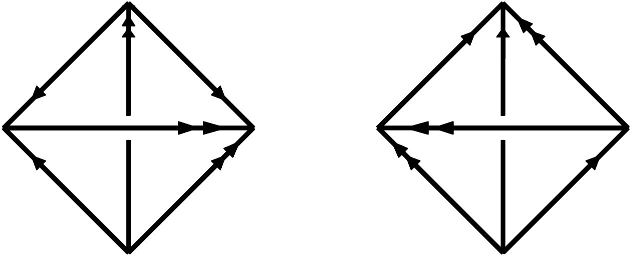

$M_8 \simeq$ gluing of the tetrahedra with vertex removed (2 tetrahedra, 4 faces, 2 edges, 1 "ideal vertex")

Parametrization

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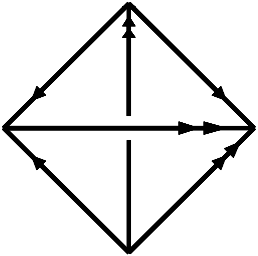
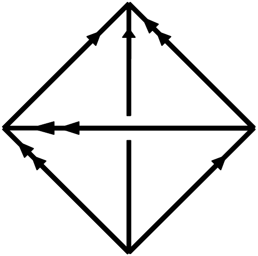
Take a complex parameter for each tetrahedron.



z



w

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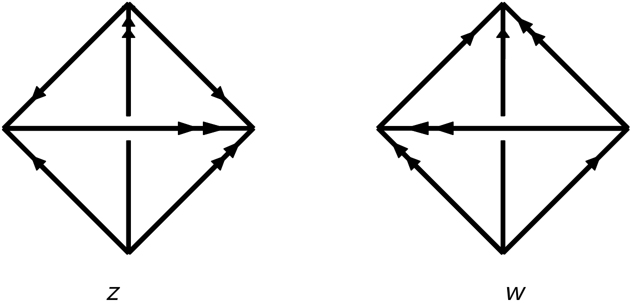

There is a *gluing equations* :

$$z^2 w^2 \frac{1}{(1-z)(1-w)} = 1.$$

Parametrization

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The deformation veriety

$$\mathrm{Defor}_2(M_8) = \left\{ z, w \in \mathbf{C} \text{ such that } z^2 w^2 \frac{1}{(1-z)(1-w)} = 1 \right\}$$

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$$L = \frac{w^2}{z^2} \text{ and } M = \frac{zw}{1-w}$$

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