

MaRDI, OSCAR and polymake

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joint w/ OSCAR and polymake teams

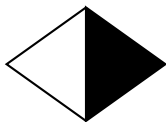
Mathematics Research Data Initiative (MaRDI)

- DFG funded project, started on 01 Oct 2021
 - lead by WIAS, 14 co-applicant institutions (including, e.g., MPI MiS, ITWM, TU Kaiserslautern, TU Berlin, ZIB)
- Task Areas
 - TA1 Computer Algebra
 - TA2 Scientific Computing
 - TA3 Statistics and Machine Learning
 - TA4 Cooperation with Other Disciplines
 - TA5 The MaRDI Portal
 - TA6 Data Culture and Community Integration
 - TA7 Governance and Consortium Management

<https://www.mardi4nfdi.de>

OSCAR v0.8.0-DEV

```
julia> K = SimplicialComplex([[1,2],[2,3],[1,3,4]])  
Abstract simplicial complex of dimension 2  
on 4 vertices  
  
julia> describe(fundamental_group(K))  
"Z"
```







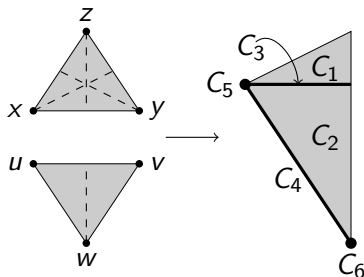
```
julia> save_simplicialcomplex(K, "K.top")
```

Stacky fans and tropical moduli in polymake

Bunnett, J. & Pfeifle, arXiv: 2101.07316

$M_2 =$

Link of cell	Group
$X_1 =$ 	S_3
$X_2 =$ 	$\langle (u, v) \rangle$
$X_3 =$ 	S_2
$X_4 =$ 	$\mathbf{1}$
$X_5 =$ \cdot	$\mathbf{1}$
$X_6 =$ \cdot	$\mathbf{1}$



```
($u, $v, $w) = (0, 1, 2);  
$G2 = new group::PermutationAction(GENERATORS=>[[ $v  
$X2 = new Cone(RAYS=>[[1,0,0], [0,1,0], [0,0,1]], GRO  
      new group::Group(HOMOGENEOUS_COORDINATE_A  
$C2 = stacky_fan($X2);
```

Stacky fans and tropical moduli in `polymake` (continued)

Bunnett, J. & Pfeifle, arXiv: 2101.07316

About subspaces of \mathbb{M}_3 :

Theorem (`polymake`)

The stacky fan $\mathbb{M}_{K_4}^{\text{pl}}$ of tropical honeycomb curves has face vector $(4, 8, 10, 7, 2)$, and the link $\text{lk}(\mathbb{M}_{K_4}^{\text{pl}})$ is contractible.

- Brodsky, J., Morrison, Sturmfels (2015)
- Chan, Gelatius & Payne (2021)