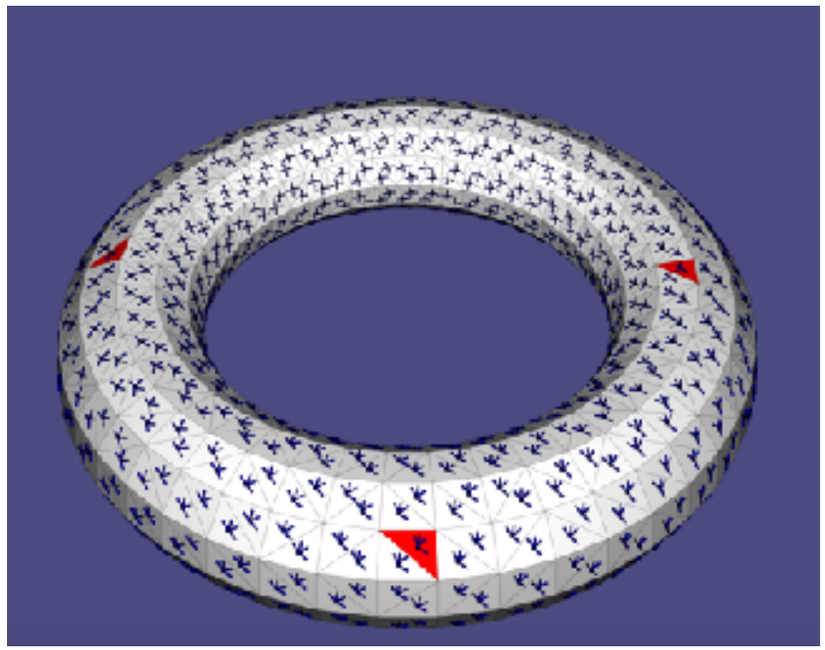

DEMOS

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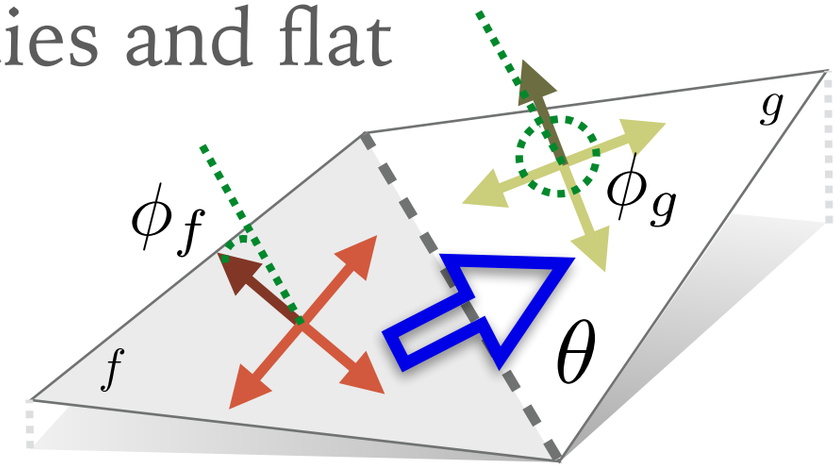
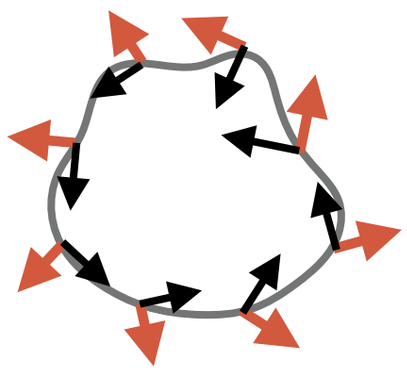
Demos: ./DirectionalFieldSynthesis/demos/external/libdirectional/examples

DEMO: TRIVIAL CONNECTIONS

- **Input:**
  - Original vertex curvatures k_0.
  - Prescribed curvatures k (cone singularities and flat vertices).
- **Output:**
  - Edge-based deviation from parallelity θ.
- Objective: as-parallel as possible.
- Linearly-constrained quadratic minimization:





As parallel as possible —> $\theta = argmin|\theta|^2 \ s.t.$

Prescribed Singularities —> $(d_0)^T\theta = k - k_0$

DEMO: GLOBALLY OPTIMAL

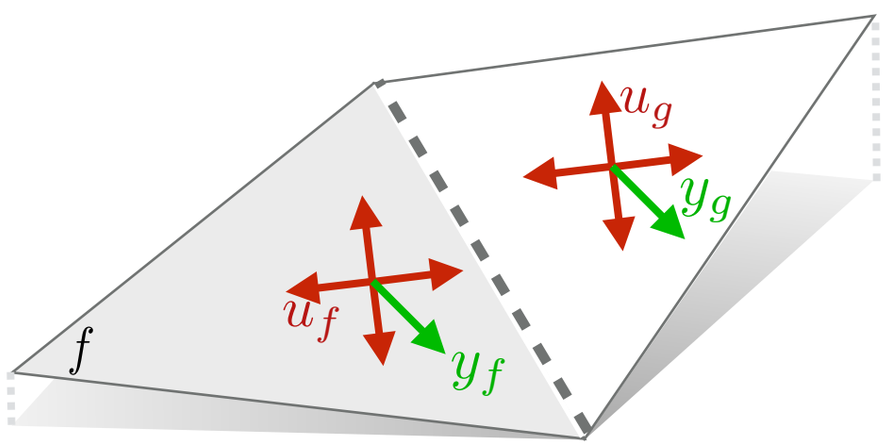
- **Input:** N-RoSy (single complex) per constrained face

$$y_f = (u_f)^N$$

- **Output:** interpolation to all free faces $y_{f_{known}} = (u_{f_{known}})^N$
- Minimizing energy: $\min E_{smooth}(\mathbf{y})$

$$E_{smooth}(\mathbf{y}) = \sum_{(f,g)} \left| (\bar{e}_f)^N y_f - (\bar{e}_g)^N y_g \right|^2 = \mathbf{y}^T Q \mathbf{y}$$

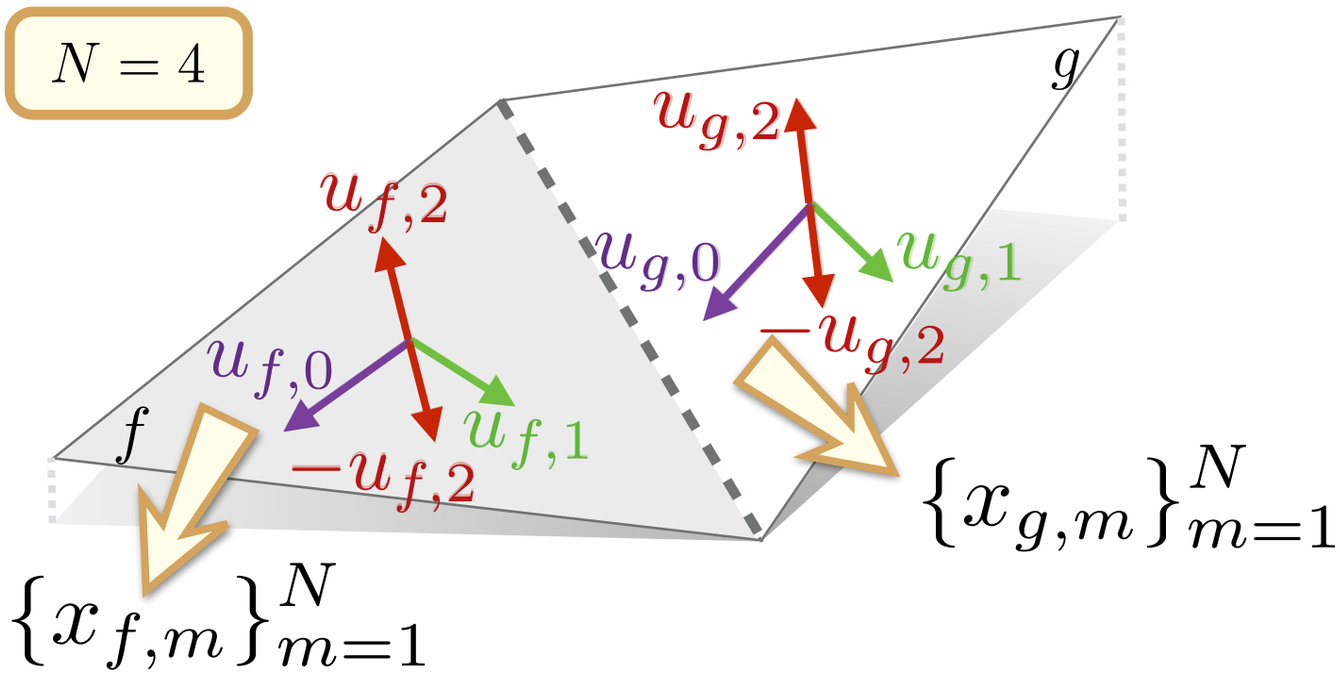
- Take roots of all y_f



[Knöppel 2013]

DEMO: POLYVECTORS

- Representing set of polynomial coefficients instead of single N-RoSy.
- Roots of polynomial = directional.
- Interpolating each like in **globally optimal.**



Ideally smooth field of m-th coefficient

$$x_{f,m}(\bar{e}_f)^m = x_{g,m}(\bar{e}_g)^m$$

$$\forall m \in \{0, \ldots, N-1\}$$