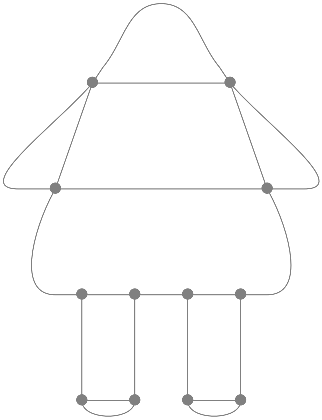
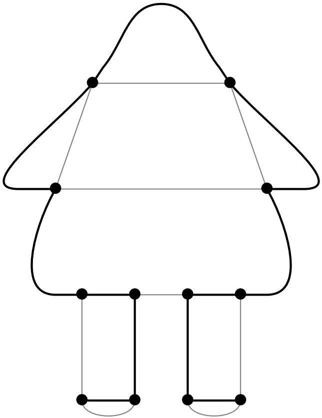
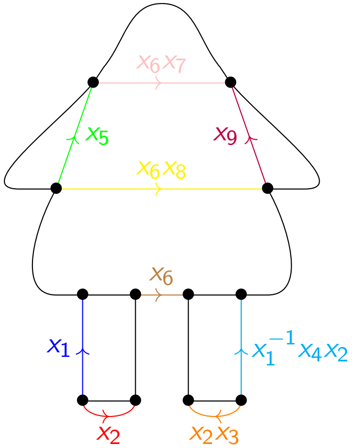
a typical element in Outer Space



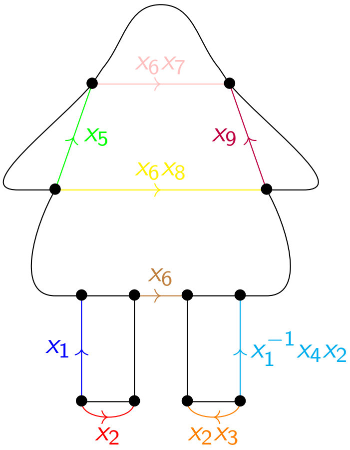
a typical element in Outer Space

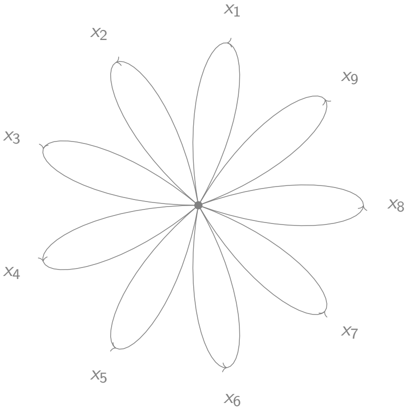


a typical element in Outer Space

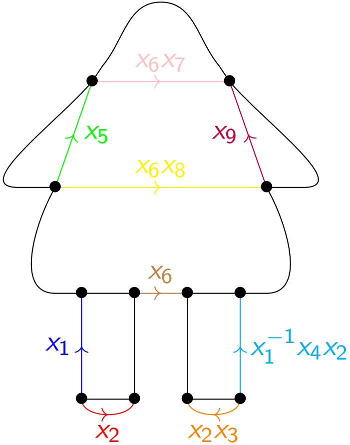


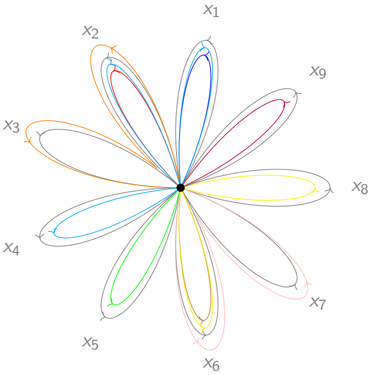
a typical element in Outer Space





a typical element in Outer Space





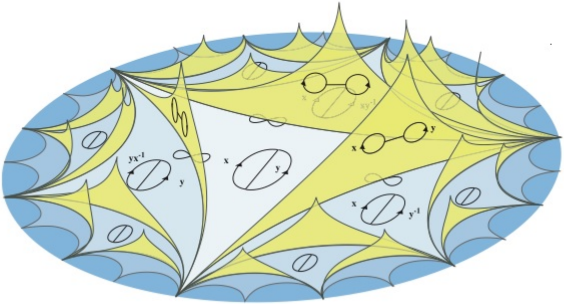
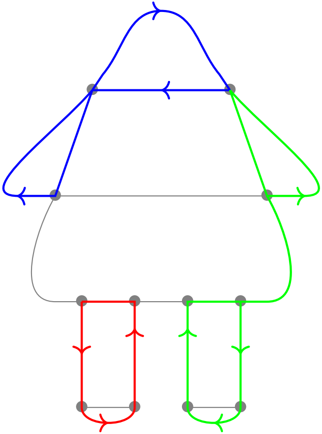
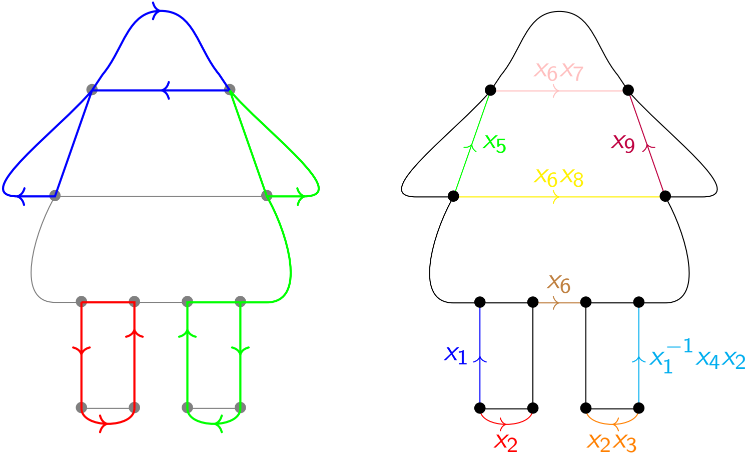
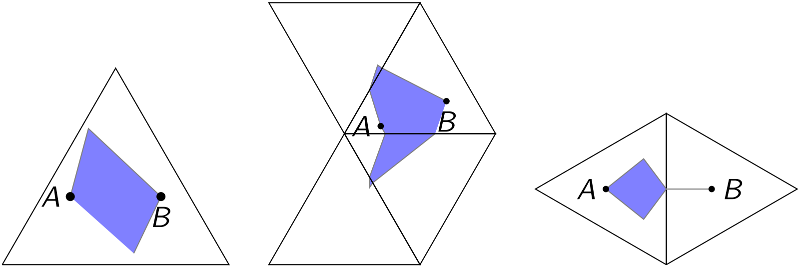


Figure: Picture of CV_2 by Karen Vogtmann




$x_6 x_7$
x_5
x_9
$x_6 x_8$
x_6
x_1
$x_1^{-1} x_4 x_2$
x_2
$x_2 x_3$

envelopes in CV_2^{red}



envelopes as polytopes

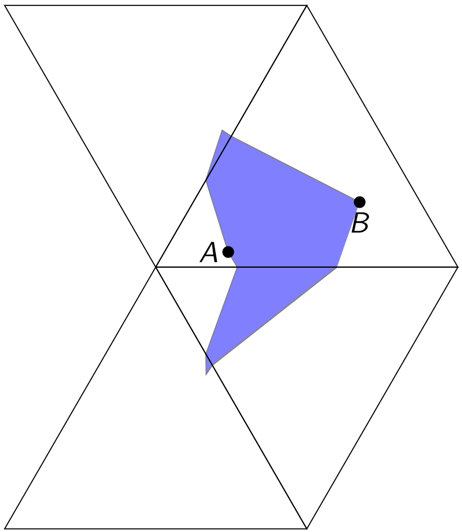
Let γ be a witness from A to B. We have $C \in \mathrm{Env}_{\mathrm{R}}(A, B)$ if and only if for each $\omega \in cand(A)$ and $\delta \in cand(C)$ the following holds:

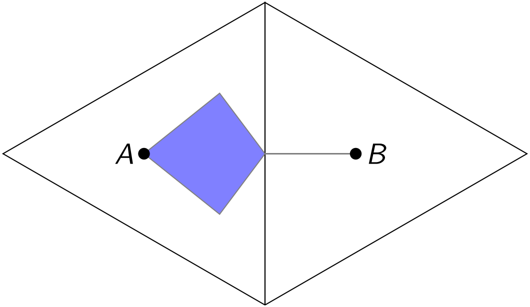
- $$\frac{l_C(\gamma)}{l_A(\gamma)} \geq \frac{l_C(\omega)}{l_A(\omega)} \iff \qquad (out)$$
  $$\sum_{e_i \in E(C)} l_C(e_i) \cdot (l_A(\omega) \cdot \#(e_i, \gamma) - l_A(\gamma) \cdot \#(e_i, \omega)) \geq 0$$
- $$\frac{l_B(\gamma)}{l_C(\gamma)} \geq \frac{l_B(\delta)}{l_C(\delta)} \iff \qquad (in)$$
  $$\sum_{e_i \in E(C)} l_C(e_i) \cdot (l_B(\gamma) \cdot \#(e_i, \delta) - l_B(\delta) \cdot \#(e_i, \gamma)) \geq 0$$

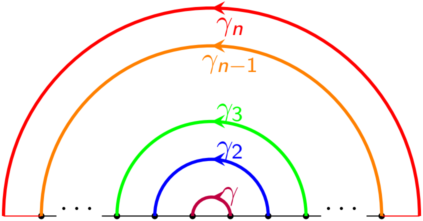
envelopes as polytopes

Let γ be a witness from A to B. We have $C \in \mathrm{Env}_{\mathrm{R}}(A, B)$ if and only if for each $\omega \in cand(A)$ and $\delta \in cand(C)$ the following holds:

- $$\frac{l_C(\gamma)}{l_A(\gamma)} \geq \frac{l_C(\omega)}{l_A(\omega)} \iff \qquad (out)$$
  $$\sum_{e_i \in E(C)} l_C(e_i) \cdot (l_A(\omega) \cdot \#(e_i, \gamma) - l_A(\gamma) \cdot \#(e_i, \omega)) \geq 0$$
- $$\frac{l_B(\gamma)}{l_C(\gamma)} \geq \frac{l_B(\delta)}{l_C(\delta)} \iff \qquad (in)$$
  $$\sum_{e_i \in E(C)} l_C(e_i) \cdot (l_B(\gamma) \cdot \#(e_i, \delta) - l_B(\delta) \cdot \#(e_i, \gamma)) \geq 0$$


A
B


A
B



Thank you for your attention!