A new perspective on $\mathbb{Z} \times \mathbb{F}$

OSU CYCLE
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Question: How are $\mathrm{Sal}(A_\Delta)$ and $\mathrm{Dav}(W_\Delta)$ related?

$\Delta := (V, E)$ graph (triangle – free)

Right Angled Artin Group: A_Δ

$A_\Delta := \langle V \,|\, uv = vu \ \forall \{u, v\} \in E \rangle$

Right Angled Coxeter Group: W_Δ

$W_\Delta := \langle V \,|\, uv = vu \ \forall \{u, v\} \in E, v^2 = id \forall v \in V \rangle$

Cayley graph of A_Δ and W_Δ

vertices: group elements; edges: connect g and h if $h = gv$ for some $v \in V$

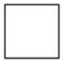
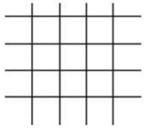
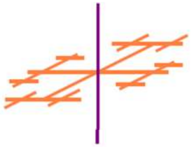
Salvetti complex $\mathrm{Sal}(A_\Delta)$ and Davis complex $\mathrm{Dav}(W_\Delta)$

square complex obtained by gluing in squares into the corresponding Cayley graph whenever possible

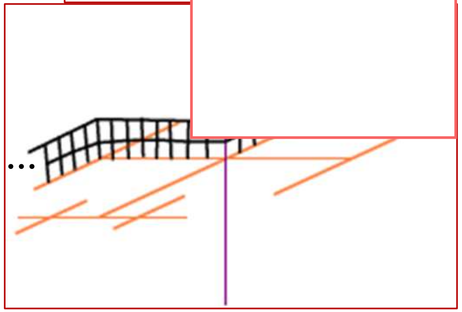
Def: An n-scaled Davis complex is obtained from $\mathrm{Dav}(W_\Delta)$ by scaling each edge in $\mathrm{Dav}(W_\Delta)$ by n.

Observation:

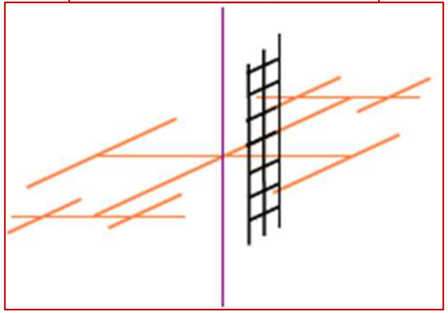
1) for every $n \in \mathbb{N}$, $\mathrm{Sal}(A_\Delta)$ contains an n-scaled Davis complex of W_Δ.
2) Any two vertices in $\mathrm{Sal}(A_\Delta)$ are contained in an n-scaled Davis complex of W_Δ.

Δ	$Cay(W_\Delta)$	$Cay(A_\Delta)$	$\mathrm{Dav}(W_\Delta)$ / $\mathrm{Sal}(A_\Delta)$
			$\mathbb{R}^2$
			$T_4 \times \mathbb{R}$

The proj... T_4 are bi...

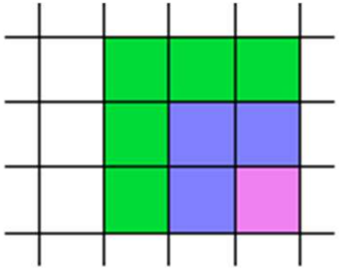


The projections onto T_4 are finite paths.



Colored regions are n-scaled $\mathrm{Dav}(W_\Delta)$ within $\mathrm{Sal}(A_\Delta)$ for Δ

n=1
n=2
n=3



Referenz: Michael W. Davis. The geometry and topology of Coxeter groups. In *Introduction to modern mathematics*, volume 33 of Adv. Lec. Math. (ALM), pages 129-142, Int. Press, Somerville, MA, 2015