

Program Summary.

During the last eight weeks, we

learned about

- Coxeter groups
- Fully commutative (FC) elements
- heaps of FC elts

developed Sage code that can

- test if an elt is w.
- find the left/right desc. of FC elts
- * - enumerate the FC elts in any Coxeter gp by length
- Create heap posets and draw their Hasse diagrams nicely.

— generalized star operations :

Star-irreducible elts

— Hecke algebras .

* more generally: groups and algebras given by presentations, using their universal properties

— KL cells

— Compute star operations and their orbits

· find KL cells quickly via star operation orbits of star-irr elts

— * compute things in the Hecke algebra using the KL basis quickly via Coxeter 3 (faster than current naive methods in Sage)

— * compute KL cells quickly, especially for some FC cells.

- Temperley-Lieb (TL) algebras
of arbitrary types

- canonical / diagram bases of TL
algebras of types B and H.

- The Markus-Lusztig (ML) involutions
for finite Coxeter gps.

- * Compute with / draw TL diagrams
in types A, B, H under the
framework of decorated
diagram algebras / decorated tangles.

- Compute the canonical basis elt / diagram
in $TL(B_n) / TL(H_n)$ for each FC elt.

- ** Compute the ML involutions in type B
and display their effects diagrammatically
for FC elts.

We will submit our code on the Sage development stream. We hope the code labelled by * (FC enumeration, KL basis/cell computation in Hecke algebras, generalized TL algebras, Mathas-Lusztig involutions) will be of general interest. We have also been able to formulate some interesting conjectures about the ML involutions on FC sets in type B. Some of us plan to continue studying the involutions elsewhere.

THANK You!