Quaterly Report

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1 Reading

1. Introduction to Lie Algebras and Representation Theory by James Humphreys - Chapter 1 of 7.

2 Research

1. Writing an algorithm to write a word in the generators for $\Omega^-(d, F)$, char $F \neq 2$ in a non-natural representation
2. Writing code to test and debug the above algorithm
3. Writing code to test and debug the natural representation code for $\Omega^-(d, F)$.
4. Fixing bugs in the non-natural representation code for $\mathrm{SU}(d, F)$, d both odd and even (two different algorithms for each).
5. Fixing bugs in the non-natural representation code for $\Omega^+(d, F)$.
6. Fixing bugs in the natural representation code for $\mathrm{SU}(d, F)$, d both odd.

3 Seminars

1. I gave two seminars on material based on James Humphreys' Reflection Groups and Coxeter Groups book.

3.1 Things To Be Done

1. Calculate the complexity of the algorithms for which this has not yet been done.
2. Construct algorithms to write an element of $\mathrm{PSX}(d, q)$ as an element of its generators by considering how the generators act on the projective points.
3. Get these algorithms to work for characteristic 2.
4. Write a paper on the above material.
5. Give talk at the Pure Maths Seminar in January.
6. Write thesis.