

Graded Specht modules in sage

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The representation theory of the symmetric groups, and more generally the cyclotomic Hecke algebras of type $G(r,1,n)$, was transformed recently when Brundan and Kleshchev showed that these algebras are (un)naturally \mathbb{Z} -graded. Shortly afterwards, Brundan, Kleshchev and Wang showed that the Specht modules for these algebras admit a \mathbb{Z} -grading. The gradings on these algebras, and their representations, amounts to choosing a special lattice which makes many features of the modular representation theory more transparent and accessible. Unfortunately, in practise, the grading is very difficult to work with. In my talk I will survey the graded representation theory of these algebras, and explain why it is so important, and then I will discuss my implementation of graded Specht modules inside sage and the new information that can be computed using this code. At the end of my talk I will describe work in progress which gives a very different implementation of the graded Hecke algebras.