Character conditions and normal subgroups
Shawn Burkett
Kent State University

There are many results in character theory that determine some restrictions on the structure of a (finite) group whose nonlinear irreducible characters have some special property. A famous example of this is Thompson's Theorem, which states that a group $G$ is $p$-nilpotent if the prime $p$ divides the degree of each nonlinear irreducible character of $G$. A quarter of a century later, this result was extended by Isaacs and Knutson to the following result about normal subgroups: If $p$ divides the degree of every irreducible character of $G$ lying over some nonlinear irreducible character of the normal subgroup $N$, then $N$ is solvable and $p$-nilpotent. Motivated by this result, we show that a number of other theorems can also be extended in this way. Then we restrict our attention to $p$ and $p'$ characters and generalize these results even more, ultimately obtaining sufficient character-theoretic conditions for the $p$-closedness or $p$-nilpotence of a normal subgroup.

A crystal for stable Grothendieck polynomials
Wencin Poh
UC Davis

We construct a type $A$ crystal, which we call the $*$-crystal, whose character is the stable Grothendieck polynomials for fully-commutative permutations. This crystal is a $K$-theoretic generalization of Morse-Schilling crystal on decreasing factorizations. Using the residue map, we showed that this crystal intertwines with the crystal on set-valued tableaux given by Monical, Pechenik and Scrimshaw. We also proved that this crystal is isomorphic to that of pairs of semistandard Young tableaux using a newly defined insertion called the $*$-insertion. The insertion offers a combinatorial interpretation to the Schur positivity of the stable Grothendieck polynomials for fully-commutative permutations. Furthermore, the $*$-insertion has interesting properties in relation to row Hecke insertion and the uncrowding algorithm. This is joint work with Jennifer Morse, Jianping Pan and Anne Schilling.

Online via Zoom
https://zoom.us/j/95321487441?pwd=T1p4VG9pejJZCekJmeDFFb1BzeWpadz09, Meeting ID: 953 2148 7441, Passcode: 722523
4 pm, Friday, October 30, 2020
Talk part 1, 4.10-4.40,
Break 4.40-5.10 at https://gather.town/HQmdvgyabpEL4qpB/RMAC,
Talk part 2 5:10-5:40

This is a joint Denver U / UC Boulder / UC Denver / U of Wyoming / CSU seminar that meets biweekly. Anyone interested is welcome to join us at a local restaurant for dinner after the talks.

Department of Mathematics
Fort Collins, Colorado 80523