Mathematics Seminar

Rocky Mountain Algebraic Combinatorics Seminar

New theorems of Skolem-Noether and Morita type for nilpotent products

James B. Wilson
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Elementary Representation Theory relies on the structure of matrix rings over fields. Foundational results include the theorems of Skolem and Noether, Morita, and Lemmas of Schur and Nakayama. Each of those results assume some form of simplicity. This limits their use in the study unipotent and nilpotent representations.

In this talk we adapt these famous claims to nilpotent products. We introduce a module theory based ideally suited for nilpotent representations. Then we link the irreducible representations to semifields and other geometrically significant creatures.

A new proof of the Artin-Zorn theorem

Tim Penttila
Colorado State University

Emil Artin first proved the theorem (first published by his student Max Zorn in 1931) that a finite alternative ring is a field. In 1942, Friedrich Levi was the first to state the geometric equivalent that a finite projective plane satisfying the little Desargues' theorem satisfies Pappus' theorem. In 1972, George Glauberman gave a characterization of finite fields of odd order using results of Adrian A. Albert and Kevin McCrimmon on finite Jordan algebras. In 1984, Gunter Heimbeck extended Glauberman's characterization to include fields of even order, and gave an elementary proof of the combined result. In this talk, the Artin-Zorn theorem is deduced from the Glauberman-Heimbeck theorem. The method of relating the two topics is one familiar to loop theorists: the study of the set of left multiplications. A brief survey will follow of extensions of the Artin-Zorn theorem, still in the finite setting, by various authors led by Michael Kallaher over the period 1968-2006, culminating in a characterisation of finite nearfield planes by a weakening of the alternative condition (due to Gerrit Bol in 1937).

Weber 223
4–6 pm
Friday, September 11, 2015
(Refreshments in Weber 117, 3:30–4 pm)
Colorado State University

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.

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