Modules over hereditary noetherian prime rings

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Content:

Hereditary noetherian prime (HNP) rings are a natural class of (in general) noncommutative rings that include such rings as commutative Dedekind domains (e.g., $\mathbb{Z}$, $\mathbb{Z}[i]$, and $\mathbb{Q}[X]$), the ring of Hurwitz quaternions, simple Dedekind domains (e.g., the first Weyl Algebra, $A_1(\mathbb{C}) = \mathbb{C}\langle x, y\rangle / \langle yx - xy - 1\rangle$), matrix rings over such rings, and certain subrings (basic idealizers) of the before mentioned rings.

Compared to vector spaces over fields, modules over a ring can exhibit very complex structure. The goal of this course is to study the class of finitely generated projective modules over hereditary noetherian prime rings, following the recent monograph of Levy–Robson. At the beginning of the course we will recall the notion of projective modules, of Ext^1, give some examples of HNP rings, and see Steinitz's Theorem on modules over commutative Dedekind domains. We then follow the monograph of Levy and Robson in developing the module theory of finitely generated projective modules over HNP rings (a recent noncommutative generalization of the classic result of Steinitz). In doing so, we encounter the concepts of a class group, faithful and cycle towers, and the genus.

Literature:

- Lam, T. Y., *Lectures on Modules and Rings*, 1999.
- Levy, Lawrence S.; Robson J. Chris, *Hereditary Noetherian Prime Rings and Idealizers*, 2011.

Prerequisites:

Familiarity with the basic notions of algebra (rings and modules). It is helpful if you already know about projective modules and basic noncommutative algebra (e.g., Artin–Wedderburn), but we will at least recall these notions when we need them.

Izvedba/Hours: 2/0

Preverjanje znanja/Examination:

The course will be graded based on an oral exam.

Semester: zimski/winter

Language: angleški/English