

Oberseminar

Block Theory

SS 2019

Termin: Mo. 15:30 – 17:00 (Raum 48-438)

Beginn: 29.04.19

WARNING: The order of talks V - XI is still provisional!

| | | |
|----------|-------------------------|---|
| 29.04.19 | Gunter Malle: | Introduction to Block Theory I |
| 06.05.19 | Emil Rotilio: | Introduction to Block Theory II |
| 13.05.19 | Giovanni de Franceschi: | Clifford theory of blocks |
| 20.05.19 | Patrick Wegener: | Equivalences of blocks and block invariants |
| 27.05.19 | Alessandro Paolini: | Blocks of finite groups of Lie type |
| 03.06.19 | Ruwen Hollenbach: | Fong reductions and blocks of p-solvable groups |
| 17.06.19 | Bernhard Böhmler: | Blocks with cyclic defect I |
| 24.06.19 | Caroline Lassueur: | Blocks with cyclic defect II |
| 01.07.19 | Niamh Farrell: | Nilpotent blocks |
| 08.07.19 | Michael Livesey: | TBC |
| 15.07.19 | TBC: | TBC |

LITERATUR

- [Alp86] J. L. Alperin, *Local representation theory*, Cambridge Studies in Advanced Mathematics, vol. 11, Cambridge University Press, Cambridge, 1986, Modular representations as an introduction to the local representation theory of finite groups. MR 860771 (87i:20002)
- [Bro94] Michel Broué, *Equivalences of blocks of group algebras*, Finite-dimensional algebras and related topics (Ottawa, ON, 1992), NATO Adv. Sci. Inst. Ser. C Math. Phys. Sci., vol. 424, Kluwer Acad. Publ., Dordrecht, 1994, pp. 1–26. MR 1308978
- [CE93] Marc Cabanes and Michel Enguehard, *Unipotent blocks of finite reductive groups of a given type*, Math. Z. **213** (1993), no. 3, 479–490. MR 1227495 (94h:20048)
- [CE99] ———, *On blocks of finite reductive groups and twisted induction*, Adv. Math. **145** (1999), no. 2, 189–229. MR 1704575
- [Isa76] I. Martin Isaacs, *Character theory of finite groups*, Academic Press [Harcourt Brace Jovanovich, Publishers], New York-London, 1976, Pure and Applied Mathematics, No. 69. MR 0460423
- [KM15] Radha Kessar and Gunter Malle, *Lusztig induction and ℓ -blocks of finite reductive groups*, Pacific J. Math. **279** (2015), no. 1-2, 269–298. MR 3437779
- [Lin18] Markus Linckelmann, *The block theory of finite group algebras. Vol. II*, London Mathematical Society Student Texts, vol. 92, Cambridge University Press, Cambridge, 2018. MR 3821517
- [LP10] Klaus Lux and Herbert Pahlings, *Representations of groups*, Cambridge Studies in Advanced Mathematics, vol. 124, Cambridge University Press, Cambridge, 2010, A computational approach. MR 2680716
- [Nav98] G. Navarro, *Characters and blocks of finite groups*, London Mathematical Society Lecture Note Series, vol. 250, Cambridge University Press, Cambridge, 1998. MR 1632299
- [NT89] Hirosi Nagao and Yukio Tsushima, *Representations of finite groups*, Academic Press, Inc., Boston, MA, 1989. MR 998775 (90h:20008)
- [Web16] Peter Webb, *A course in finite group representation theory*, Cambridge Studies in Advanced Mathematics, vol. 161, Cambridge University Press, Cambridge, 2016. MR 3617363

Interessierte Hörer sowie weitere Vortragende sind herzlich willkommen!

TALK DESCRIPTIONS (TENTATIVE)

Talk length: 90 minutes

29.04.19 – TALK I. Introduction to block theory I

The aim of this talk is to introduce block theory from the point of view of modules and algebras including: a recap of the essential results needed from representation theory, central primitive idempotents, defect groups, Brauer's main theorems, the Green correspondence etc. Sources: [Alp86], [Web16], [LP10], [NT89]

06.05.19 – TALK II. Introduction to block theory II

The aim of this talk is to present (mostly) the same material that we saw in the first lecture, but now from the character theoretic viewpoint as in [Nav98]. The idea is to provide the necessary vocabulary and notation so that the results in later talks can be presented from whichever viewpoint is most suitable. Source: [Nav98, Chapters 2-3]

13.05.19 – TALK III. Clifford theory of blocks

This should cover the basics about Clifford theory of blocks including (possibly) a quick recap of Clifford theory for characters, and covering the Fong-Reynolds reduction. Source: [NT89, Chapter 5, Sections 5-8], [Nav98, Chapter 9]. (For Clifford theory of characters see [Isa76, Chapter 6])

20.05.19 – TALK IV. Equivalences of blocks and block invariants

This talk is a survey of the equivalences that can exist between blocks, and the block invariants which are preserved by each equivalence. Source: [Bro94]

27.05.19– TALK V. Blocks of finite groups of Lie type

This survey talk will present the theory of blocks of finite groups of Lie type, including the parametrization of blocks by e -Jordan cuspidal pairs. Sources: [CE93],[CE99], [KM15] etc

03.06.19 – TALK VI. Fong reductions and blocks of p -solvable groups

This talk will present the case of blocks of p -solvable groups – what is known and why this situation works so nicely. The Fong reductions will be introduced and their importance for p -solvable groups explained. Source: [Nav98, Chapter 10]

17.06.19 – TALK VII. Blocks with cyclic defect I

In this talk we will revisit the properties of blocks with cyclic defect which we saw in the Oberseminar last semester. Source: [Alp86, Chapter V].

24.06.19 – TALKS VIII. Blocks with cyclic defect II

In this talk we will look at the indecomposable modules of blocks with cyclic defect.

01.07.19 – TALK IX. Nilpotent Blocks

In this survey talk we will define nilpotent blocks and present the main results known about these blocks. Source: [Lin18]

08.07.19 – TALK X. TBC

TBC

15.07.19 – TALK XI. TBC

TBC