

On the nilpotency index of the radical of a group
algebra of an affine group

K. Motose

James Madison Univ., Harrisonburg, VA, USA での Conference における Program, Abstract と口頭発表 (July 27, 2001) の OHP 原稿 (これは後の岡山大学での Symposium での原稿を参照)。

June 2003 本瀬香

CONFERENCE SCHEDULE

| | Sunday 22 July 2001 | Monday 23 July 2001 | Tuesday, 24 July 2001 | Wednesday, 25 July 2001 | Thursday, 26 July 2001 | Friday, 27 July 2001 | Saturday, 28 July 2001 |
|----------------------------|---------------------------------------|--|-------------------------------------|--|-------------------------------------|-------------------------------------|--|
| 8:50-9:00 | | Welcome | | | | | |
| Morning Session (B31) | | | | | | | DEPARTURE |
| 9:00 | A | A | A | A | A | A | |
| 9:30 | B | B | B | B | B | B | |
| 10:00 | Coffee/Tea | Coffee/Tea | Coffee/Tea | Coffee/Tea | Coffee/Tea | Coffee/Tea | |
| 10:30 | Plenary Address | Plenary Address | Plenary Address | Business Meeting | Plenary Address | Plenary Address | |
| 11:30 | C | C | C | 11:30 am - 10:30 pm | C | C | Van to Dulles departs at 1:00 pm |
| noon-1:30 | Lunch (11-1:30) | Lunch (11-1:30) | Lunch (11-1:30) | | Lunch (11-1:30) | Lunch (11-1:30) | |
| Afternoon Session (B31) | | | | Bus Trip to Harper's Ferry. Meet behind Burruss Hall. Box lunch on Bus. Dinner at Wayside Inn. Late return to Campus | | | |
| 2:00 | D | D | D | D | D | D | |
| 2:30 | E | E | E | E | E | E | |
| 3:00 | Coffee/Tea | Coffee/Tea | Coffee/Tea | lunch on Bus. | Coffee/Tea | Coffee/Tea | |
| 3:30 | Burruss Hall. | Rare Books Presentation | Rare Books Presentation | Dinner at Wayside Inn. | F | F | |
| 4:00 | Arrival at any other time | Happy Hour Supper | Happy Hour Supper | Late return to Campus | G | G | |
| 4:45 | requires check in at Taylor 233 | Group Picture at Chandler Hall | Happy Hour Supper (4:30-6:30) | Late return to Campus | Happy Hour Supper (4:30-6:30) | Happy Hour Supper (4:30-6:30) | |
| 5:30 | | | | | | | |
| 5:45 | | Open Bar at Chandler hall | | | | | |
| 6:00-8:30 | | Supper and entertainment at Chandler Hall | | | | | |

International Conference on Narrings and Nearfields
Harrisonburg
July 23-27, 2001

All talks will be in room 31 of Burruss Hall with the exception of the presentation by Dr. Gerhard Betsch on Tuesday at 3:30 on rare mathematical and science books of the University of Virginia Library, which will be held in room 301 of the JMU Library.

Monday, July 23

- 8:50 Opening of the Conference: Dr. Douglas T. Brown, Vice President for Academic Affairs
- 9:00 Chris Devillier: Bridging the gap between $M_0(G)$ and $\text{End}(G)$
- 9:30 John Hartney: Right representation for right dg near-rings
- 10:00 Coffee/tea break
- 10:30 Henry Healthierly: D. g. near rings
- 11:30 Yuen Fong: On derivations of centralizer near-rings
- 12:00 Lunch
- 2:00 Peter Mayr: Frobenius groups
- 2:30 Johan Meyer: Ideals in group near rings
- 3:00 Coffee/tea break
- 3:30 Gregory Boudreaux: Recent results in endomorphism near rings
- 4:00 Gary Peterson: Normal modules

Tuesday, July 24

- 9:00 Juergen Ecker: Compatible functions on groups
- 9:30 Franz Binder: Algorithms for near rings
- 10:00 Coffee/tea break
- 10:30 Stuart Scott: Even in finite narrings with identity, nilpotency can be arbitrarily complex
- 11:30 Peter Fuchs: A class of strongly near-rings
- 12:00 Lunch
- 2:00 Amie Moch: Forcing linearity numbers of injective modules of Dedekind domains
- 2:30 Carl Maxson: More on forcing linearity numbers
- 3:00 Coffee/tea break
- 3:30 Gerhard Betsch: Early works in mathematics and science

Wednesday, July 25

- 9:00 Gary Birkenmeier: Baer type conditions on near-rings
- 9:30 Howard Bell: Some commutativity results for near-rings
- 10:00 Coffee/tea break
- 10:30 Business Meeting

Thursday, July 26

- 9:00 Werner Olivier: On Hoehnke radicals of near-rings
- 9:30 Nico Groenewald: On uniformly strongly prime near-rings
- 10:00 Coffee/tea break
- 10:30 Erhard Aichinger: Near-rings of polynomial functions
- 11:30 Geoffry Booth: Counting radicals in near-rings
- 12:00 Lunch
- 2:00 Jaime Gutierrez: Functional decomposition on multivariate polynomial near rings
- 2:30 Wen-Fong Ke: The automorphism groups of certain 2-(v,k) designs from finite fields
- 3:00 Coffee/tea break
- 3:30 Gerhard Betsch: Roots of nearring theory

Friday, July 27

- 9:00 Joseph Essilfie: Every field is a Euclidean domain
- 9:30 Hubert Kiechle: Circularity of certain F-pairs
- 10:00 Coffee/tea break
- 10:30 Stefan Veldsman: How round is a circle?
- 11:30 Yong Uk Cho: Some properties of strong reducedness in near-rings
- 12:00 Lunch
- 2:00 Dorota Niewieszczerzal: More about homogeneous near rings
- 2:30 Mark Farag: Near ring extensions
- 3:00 Coffee/tea break
- 3:30 Kaoru Motose: On the nilpotency index of the radical of a group algebra of a sharply 2-transitive group
- 4:00 Kirby Smith: On matrix near rings

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On the nilpotency index of the radical of
a group algebra of an affine group

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Let $t(G)$ be the nilpotency index of the radical of a group algebra of a finite p -solvable group G over a field of characteristic p . Then it is well known that

$$p^s \geq t(G) \geq s(p-1) + 1$$

where p^s is the order of a p -Sylow subgroup of G .

H. Fukushima [1] characterized a group G of p -length 2 satisfying $t(G) = s(p-1) + 1$ under a condition such that

the p' -part $V = O_{p',p}(G)/O_p(G)$ is abelian.

In this talk, we shall show that the next group G of p -length 2 with the non abelian p' -part V satisfies $t(G) = s(p-1) + 1$ where $s = rpn + 1$.

This new example will contribute to our research.

Let (q, n) be a Dickson pair where p is a prime and $q = p^r$. Then (q^p, n) is also a Dickson pair. Let $D = D_{q^p, n}$ be a finite Dickson near field defined by a finite field of order q^{pn} and its automorphism $x \rightarrow x^{q^p}$.

The following affine group G over D is our object (see [2]).

$$G = \{x \rightarrow ax^{q^{nk}} + b \mid a \in D^*, b \in D, k = 0, \dots, p-1\}$$

References

1. H. Fukushima, On groups G of p -length 2 whose nilpotency indices of $J(KG)$ are $a(p-1) + 1$, Hokkaido Math. J. 20(1991), 523-530.
2. K. Motose, On the nilpotency index of the radical of a group algebra. III, J. London Math. Soc. (2), 25(1982), 39-42.