

Research

My current research interests include the study of semigroups of transformations of various types, especially their combinatorial and rank properties. I also have interest in discrete mathematics as well as recreational mathematics which include topics like magic squares and cubes, calendars and puzzles.

Publications List^A

Journal Publications:

1. Umar, A. On the semigroups of order-decreasing finite full transformations. *Proc. Roy. Soc. Edinb. Sect. A* **120** (1992), 129-142.
2. Umar, A. On the semigroups of partial one-to-one order-decreasing finite transformations. *Proc. Roy. Soc. Edinb. Sect. A* **123** (1993), 355-363.
3. Umar, A. On the ranks of certain finite semigroups of order-decreasing transformations. *Portugaliae Mathematica* Vol. **53** Fasc. 1 (1996), 23-34.
4. Umar, A. A class of quasi-adequate transformation semigroups. *Portugaliae Mathematica* Vol. **51** Fasc. 4 (1994), 553-570.
5. Umar, A. Semigroups of order-decreasing transformations: the isomorphism theorem. *Semigroup Forum* Vol. **53** (1996), 220-224.
6. Makanjuola, S. O. and Umar, A. On a certain subsemigroup of the bicyclic semigroup. *Communications in Algebra* **25** (2) (February, 1997), 509-519.
7. Umar, A. Enumeration of certain finite semigroups of transformations. *Discrete Math.* **189** (1998), 291-297.
8. Umar, A. On certain infinite semigroups of order-decreasing transformations I. *Communications in Algebra* **25** (9) (September, 1997), 2987-2999.
9. Umar, A. Some remarks about Fibonacci groups and semigroups. *Communications in Algebra* **25** (12) (December, 1997), 3973-3977.
10. Umar, A. A class of (0)-idempotent-free transformation semigroups. *Semigroup Forum* **59** (1999), 74-78.
11. Umar, A., On certain infinite semigroups of order-increasing transformations II. *Arabian Journal for Science and Engineering*. Vol. 28, **2A** (2003), 203-210.
12. Laradji, A. and Umar, A., "Combinatorial results for semigroups of order-preserving partial transformations". *Journal of Algebra* **278** (2004), 342-359.
13. Laradji, A. and Umar, A., "On certain finite semigroups of order-decreasing transformations I". *Semigroup Forum* **69** (2004), 184-200.
14. Laradji, A. and Umar, A., "On the number of nilpotents in the partial symmetric semigroup". *Communications in Algebra*, **32** (2004), 3017-3023.
15. Laradji, A. and Umar, A., "Combinatorial results for semigroups of order-decreasing partial transformations". *J. Integer Sequences* **7** (2004), 04.3.8.
16. Laradji, A. and Umar, A., "Asymptotic results for semigroups of order-preserving partial transformations". *Communications in Algebra* **34** (2006), 1071-1075.
17. Laradji, A. and Umar, A., "Combinatorial results for semigroups of order-preserving full transformations". *Semigroup Forum* **72** (2006), 51-62.
18. A. Umar, B. Yushau and B. M. Ghandi, "Convolution of two series" *Australian Senior Maths Journal*. (accepted).

⊕ Articles number [1, 2, 3 & 8] are from my Ph.D. thesis. Article [5] is a slight extension of a major result in my Ph. D. thesis, but more importantly the main proof is more elegant than the one given in the thesis.

⊕ In almost all mathematical journals, authors' names are listed alphabetically (by last names) and not in order of contribution as in other scientific journals.

Conference Papers:

19. Umar, A. "Semigroups of order-decreasing full transformations." Proceedings of the international conference, Colchester, UK, August 3-6, 1993. Colchester: University of Essex, Dept. of mathematics, August (1994), 94-98.
20. Umar, A. "On a class of orthodox transformation semigroups." 15th Annual Conference of the Nigerian Mathematical Society, University of Nigeria, Nsukka, April 1994.
21. Umar, A. "On some generalizations of the hat problem and transformation semigroups." International Algebraic Conference, Ekaterinburg Russia, August 29- Sept. 3, 2005, p. 203.
22. A. Umar, B. Yushau and B. M. Ghandi, (2006) "Patterns in convolution of two series", in Stewart, S. M., Olearski, J. E. and Thompson, D. (Eds), Proceedings of the Second Annual Conference for Middle East Teachers of Science, Mathematics and Computing (pp. 95-101). METSMaC: Abu Dhabi.

Technical Reports:

23. Umar, A., "Construction of Even Order Magic Squares," Technical Report No. 233, (July 1998) Department of Mathematical Sciences, KFUPM.
24. Higgins, P. M. and Umar, A., "Semigroups of weak V-Stabilizer mappings," Technical Report No. 238, (November 1998) Department of Mathematical Sciences, KFUPM.
25. Higgins, P. M. and Umar, A., "Semigroups of Order-decreasing Transformations: Some Fundamental Congruences," Technical Report No. 268, (September 2001) Department of Mathematical Sciences, KFUPM.
26. Laradji, A. and Umar, A., "On certain finite semigroups of order-decreasing transformations I," Technical Report No. 298, (May 2003) Department of Mathematical Sciences, KFUPM. (This has appeared as publication no. 13 above.)
27. Laradji, A. and Umar, A., "On the number of nilpotents, in partial symmetric semigroup," Technical Report No. 305, (June 2003) Department of Mathematical Sciences, KFUPM. . (This has appeared as publication no. 14 above.)
28. Laradji, A. and Umar, A., "Combinatorial results for semigroups of order-decreasing partial transformations," Technical Report No. 306, (June 2003) No. 305, (June 2003) Department of Mathematical Sciences, KFUPM. . (This has appeared as publication no. 15 above.)
29. Laradji, A. and Umar, A., "Asymptotic results for semigroups of order-preserving partial transformations," Technical Report No. 310, (October 2003) Department of Mathematical Sciences, KFUPM. . (This has appeared as publication no. 16 above.)
30. Laradji, A. and Umar, A., "On the number of decreasing and order-preserving partial transformations," Technical Report No. 312, (January 2004) Department of Mathematical Sciences, KFUPM.
31. Laradji, A. and Umar, A., "Combinatorial results for semigroups of order-preserving partial transformations," Technical Report No. 313, (January 2004) Department of Mathematical Sciences, KFUPM. . (This has appeared as publication no. 12 above.)

Submitted for publication:

32. Laradji, A. and Umar, A., "Combinatorial results for the symmetric inverse semigroup".
33. Laradji, A. and Umar, A., "Lattice paths and partial order-preserving transformations".
34. A. Umar and Bashir Ali, "Combinatorial properties of the alternating group".

Work In Progress:

35. Characterization of congruences on the semigroups of order-decreasing mappings (joint work with P. M. Higgins).
36. Generalizing the theory of semigroups of order-decreasing transformations on totally ordered sets to partially ordered sets (posets).

Referees

Professor John M. Howie
Mathematical Institute
North Haugh
St Andrews, Fife KY16 9SS
Scotland, U. K.

Tel. No. 01334 463746
Fax No. 01334 463748
E-mail: jmh@st-andrews.ac.uk

Professor Peter M. Higgins
Department of Mathematics and Statistics
University of Essex
Wivenhoe Park
Colchester CO4 3SQ
England.

Tel. No. 01206 873019
Fax No. 01206 873598
E-mail: peteh@essex.ac.uk

Professor Gracinda M. S. Gomes
Centro de Algebra
Universidade de Lisboa
Av. Prof. Gama Pinto, 2
1699 Lisboa Codex
Portugal.

Tel. No. 790 47 00
Fax No. 795 42 88
E-mail: ggomes@alfl.cii.fc.ul.pt

Dr. Colin M. Campbell
Mathematical Institute
North Haugh
St Andrews, Fife KY16 9SS
Scotland, U. K.

Tel. No. 01334 463739
Fax No. 01334 463748
E-mail: cmc@st-andrews.ac.uk

Professor S Kabbaj
Department of Mathematical Sciences
King Fahd University of Petroleum
and Minerals
Dhahran 31261
Saudi Arabia.

Tel. No. 860 4607
Fax No. 860 2340
E-mail: kabbaj@kfupm.edu.sa