

AD-A239 284



REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE	3. REPORT TYPE AND DATES COVERED FINAL, 01 Aug 88 - 30 Sep 90	
4. TITLE AND SUBTITLE ERROR CORRECTING CODES AND RELATED DESIGNS			5. FUNDING NUMBERS AFOSR-88-0237 61102F 2304/B1	
6. AUTHOR(S) Professor Vera Pless				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Dept of Math, Statistics & Computer Science University of Illinois at Chicago Chicago, Illinois 60680			8. PERFORMING ORGANIZATION REPORT NUMBER AFOSR-TB- 91 0683	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR/NM Bldg 410 Bolling AFB DC 20332-6448			10. SPONSORING/MONITORING AGENCY REPORT NUMBER AFOSR-88-0237	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Professor Pless has made fundamental contributions to the theory of Reed-Muller codes. In particular, she has enumerated the binary self-dual Reed-Muller codes.				
REPRODUCED FROM BEST AVAILABLE COPY				
14. SUBJECT TERMS			15. NUMBER OF PAGES	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UL	

Error Correcting Codes and Related Designs

Final Report: AFOSR-88-0237

Covering August 1988 - October 1990



A-1

91-06898



Prepared by Vera Pless - Principal Investigator
Department of Mathematics, Statistics and Computer Science
University of Illinois at Chicago (M/C 249)
Chicago, Illinois 60680
312-413-2177

Vera Pless

I. The following papers acknowledge Air Force support

1. (with R. Brualdi), Subcodes of Hamming codes, *Congressus Numerantium* 70 (1990), 153-158.
2. (with R. Brualdi), Orphans of the first order Reed-Muller codes, *IEEE Trans. Inform. Theory*, IT-36 (1990), 399-401.
3. (with C. Lam), There is no $(24, 12, 10)$ extremal quaternary code, *IEEE Trans. Inform. Theory*, IT-36 (1990), 1153-1156.
4. Games and Codes, *Proceedings of Symposia in Applied Mathematics*, 43 (1991), 101-110.
5. (with R. Brualdi), Weight Enumerators of Self-Dual Codes, *IEEE Trans. Inform. Theory*, IT-37 (1991), 1222-1224.
6. Codes and designs, existence and uniqueness, *Discrete Math.*, to appear.
7. (with R. Brualdi and N. Cai), Orphan structure of the first order Reed-Muller codes, *Discrete Math.*, to appear.
8. (with J. H. Conway and N.J.A. Sloane), The binary self-dual codes of length up to 32: A revised enumeration, *JCT (A)*, to appear.

II. Invited talks

1. "Introduction to Error Correcting Codes and a New Decoding Scheme," Northern Illinois evening talk for graduate students and faculty, Dekalb, IL, October 17, 1988.
2. "Decoding the Golay Code," Math. Colloquium, Northern Illinois University, Dekalb, IL, October 28, 1988.
3. "On the Covering Radius of Codes," Combinatorics Seminar, University of Wisconsin-Madison, WI, November 18, 1988.
4. "Codes and Designs," Mathematics Colloquium, Technion, Haifa, Israel, March 6, 1989.
5. "On the Covering Radius of Codes," Discrete Math. Group Seminar, Weizmann Institute of Science, Rehovot, Israel, March 29, 1989.
6. "Orphans of the First-Order Reed-Muller Codes," Bellcore Seminar, Bellcore, Morristown, N.J., December 4, 1989.
7. "Orphans of the First-Order Reed-Muller Codes," International Conference on Application of Algebraic Geometry, University of Puerto Rico, Rio Piedras, Puerto Rico, January 11, 1990.
8. "Orphans of the First-Order Reed-Muller Codes," IEEE International Symposium on Information Theory, San Diego, Calif., January 18, 1990.
9. "Extremal Codes and Homogeneous," IEEE International Symposium on Information Theory, San Diego, Calif., January 19, 1990.

Vera Pless

10. "There is no Quaternary (24, 12, 10) Extremal Code," IEEE International Symposium on Information Theory, San Diego, Calif., January 19, 1990.
11. "Extremal Self-Dual Codes" and "Orphans of First-Order Reed-Muller Codes," 3rd Auburn Combinatorics Conference, Auburn University, Auburn, Alabama, March 22, 1990.
12. "Orphans of the First-Order Reed-Muller Codes," Designs and Codes, Oberwolfach, Germany, April 14, 1990.
13. "Extremal Self-Dual Codes," Sixth Haifa Matrix Theory Conference, Technion, Haifa, Israel, June 12, 1990.
14. "On Self-Dual Codes," Mathematics Colloquium, Hebrew University, Jerusalem, Israel, June 7, 1990 and Weizmann Institute, Rehovot, Israel, June 18, 1990.
15. "On Games and Codes," A.M.S. short course, Ohio State University, Columbus, Ohio, August 7, 1990.

III. Other Activities

1. On National Research Council Committee to advise N.S.A. about Ocrea grants.
2. Editor: *Journal of Combin. Theory (A)*
Algebras, Groups and Geometries
Associate Editor: *Linear Algebra and Its Applications*

IV. Graduate Students

My student, Venessa Job, received her Ph.D. in 1989; "On Polyadic Codes". She is presently a Clare Booth Luce professor at Marymount University in Arlington, VA.

My student, Xiang-Dong Hou received his Ph.D. in 1990; "On the Covering Radius of Codes". He is presently an assistant professor at Wright State University in Dayton, Ohio.

I supervised Ning Cai - a postdoctoral mathematician in 1989.

During this period I supervised Jesse Nemoyer and Laura Monroe who are working on their theses.