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1 PAGE Dist: A

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OMB No. 0704-0188Public report  
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## 1. AGENCY

July 26 1994

## 3. REPORT TYPE AND DATES COVERED

FINAL 15 OCT 93 - 14 APR 94

## 4. TITLE AND SUBTITLE

FINITE MARKOV CHAINS AND RANDOM DISCRETE STRUCTURES (u)

## 5. FUNDING NUMBERS

AF/F49620-94-1-0009

2304/ES

61102F

## 6. AUTHOR(S)

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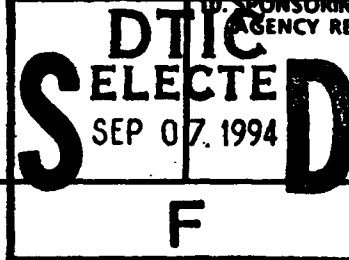
## 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Institute for Mathematics and its Applications  
University of Minnesota  
514 Vincent Hall  
206 Church Street SE  
Minneapolis, MN 554558. PERFORMING ORGANIZATION  
REPORT NUMBER

IMA Final Report-1

AFOSR-TR- 94 0520

## 9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Office of Scientific Research  
110 Duncan Avenue, Suite B115  
Bolling AFB, DC 20332-644810. SPONSORING / MONITORING  
AGENCY REPORT NUMBER

## 11. SUPPLEMENTARY NOTES

See attached list

## 12a. DISTRIBUTION / AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE:  
DISTRIBUTION UNLIMITED

A

## 12b. DISTRIBUTION CODE

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## 13. ABSTRACT (Maximum 200 words)

This grant from the Air Force Office of Scientific Research supported the research related to the two IMA Workshops *Finite Markov Chain Renaissance* held on October 18-22, 1993 and *Random Discrete Structures* held on November 15-19, 1993. The first workshop was organized by Persi Diaconis and David Aldous, while the second one by David Aldous and Robin Pemantle. Both workshops were integral parts of the IMA 1993-1994 year-long program on "EMERGING APPLICATIONS OF PROBABILITY." The October workshop addressed the following issues: Theoretical computer science examples: successes and open problems; computation-Bayesian statistics; Classical probability examples: successes and open problems; Mathematical theory and other aspects of Markov Chains. The November workshop explored examples from Jung's work on synchronicity to recent studies of parapsychology; random graphs; random permutations and Stein's method. In addition this workshop addressed new questions concerning probability on discrete infinite structures.

The services of J. Michael Steele, a senior fellow was partially supported by this grant. Steele provided over-all direction for the entire probability program. Similarly, the grant supported 8 one-month visitors and 21 workshop participants.

Grant AF/F49620-94-1-009 also supported the publication of the technical research reports submitted by the workshop participants for inclusion in the the IMA Preprint Series, and two IMA Proceedings Volumes.

## 14. SUBJECT TERMS

random discrete structures, theoretical computer science, Bayesian statistics, classical probability, Markov chains, Jung's work on synchronicity, random graphs, random permutations

## 15. NUMBER OF PAGES

5

## 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

SAR

INSTITUTE FOR MATHEMATICS AND ITS APPLICATIONS

- (1) CONTRACT OR GRANT NUMBER: AF/F49620-94-1-0009
- (2) PERIOD COVERED BY REPORT: October 15, 1993-July 1994
- (3) GRANT TITLE: FINITE MARKOV CHAINS AND RANDOM DISCRETE STRUCTURES
- (4) NAME OF INSTITUTION: UNIVERSITY OF MINNESOTA, MINNEAPOLIS
- (5) AUTHOR OF REPORT: Avner Friedman

LIST OF MANUSCRIPTS SUBMITTED FOR THE IMA PROCEEDINGS  
VOLUMES UNDER AFOSR SPONSORSHIP

DISCRETE PROBABILITY AND ALGORITHMS (workshop was held on September 20-24, and 1993 and October 18-22, 1993)

Editors: David Aldous, Persi Diaconis, J. Michael Steele and Joel Spencer

1. David Aldous, On simulating a Markov chain stationary distribution when transition probabilities are unknown
2. Noga Alon, A note on network reliability
3. Persi Diaconis and Anil Gangolli, Rectangular arrays with fixed margins
4. Persi Diaconis and Susan Holmes, Three Examples of Monte-Carlo Markov Chains: at the Interface between Statistical Computing, Computer Science, and Statistical Mechanics
5. James Allen Fill and Robert P. Dobrow, The move-to-front rule for self-organizing lists with Markov dependent requests
6. Anant P. Godbole, Daphne E. Skipper, and Rachel A. Sunley, The asymptotic lower bound on the diagonal ramsey numbers: A closer look
7. Anna R. Karlin and Prabhakar Raghavan, Random walks and undirected graph connectivity: a survey
8. Joel Spencer and Prasad Tetali, Sidon sets with small gaps
9. J. Michael Steele, Variations on the monotone subsequence
10. Eli Shamir, Generalized chromatic numbers of random graphs

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11. Dominic Welsh, Randomised approximation schemes for Tutte-Gröthendieck invariants
12. J.E. Yukich, Quasi-Additive Euclidean Functionals

RANDOM DISCRETE STRUCTURES (workshop was held on November 15-19, 1993)

Editors: David Aldous and Robin Pemantle

1. David Aldous, Probability distributions on cladograms
2. Robert M. Burton and William G. Faris, Stability of self-organizing processes
3. Amir Dembo and Ofer Zeitouni, Large deviations for random distribution of mass
4. Amir Dembo and Yosef Rinott, Some examples of normal approximations by Stein's method
5. Luc Devroye and Olivier Kamoun, Random minimax game tress
6. Persi W. Diaconis, Susan Holmes, Svante Janson, Steven P. Lallek, and Robin Pemantle, Metrics on compositions and coincidences among renewal sequences
7. Bert Fristedt, Intersections and limits of regenerative sets
8. Martin Hildebrand, Random Processes of the form  $X_{n+1} = a_n X_n + b_n \pmod{p}$  where  $b_n$  takes on a single value
9. Svante Janson, The second moment method, conditioning and approximation
10. Charles R. Johnson and John H. Drew, The no long odd cycle theorem for completely positive matrices
11. Russell Lyons, How fast and where does a random walker move on a random tree?
12. Sam Northshield, Recurrence, amenability, and the universal cover of graphs
13. Robin Pemantle, Sharpness of second moment criteria for branching and tree-indexed processes. This paper is rejected by Pemantle himself.
14. Robin Pemantle and Yuval Peres, On which graphs are all random walks in random environments transient?

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15. Thomas S. Salisbury, Energy, and intersections of Markov chains
16. Paul Erdős, Svante Janson, Tomasz Luczak and Joel Spencer, A note on triangle-free graphs

LIST OF MANUSCRIPTS PUBLISHED IN THE IMA PREPRINT SERIES  
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- 1166 Ruben D. Spies, Local existence and regularity of solutions for a mathematical model of thermomechanical phase transitions in shape memory materials with Landau-Ginzburg free energy
- 1168 Angelo Favini, Mary Ann Horn, Irena Lasiecka & Daniel Tataru, Global existence, uniqueness and regularity of solutions to a Von Kármán system with nonlinear boundary dissipation
- 1186 Mary Ann Horn & Irena Lasiecka, Uniform decay of weak solutions to a von Kármán plate with nonlinear boundary dissipation
- 1187 Mary Ann Horn, Irena Lasiecka & Daniel Tataru, Well-posedness and uniform decay rates for weak solutions to a von Kármán system with nonlinear dissipative boundary conditions
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- 1200 János Pach, Farhad Shahrokhi & Mario Szegedy, Application of the crossing number
- 1202 Joel Spencer, The Erdős-Hanani conjecture via Talagrand's inequality
- 1204 Russell Lyons, Robin Pemantle & Yuval Peres, When does a branching process grow like its mean? Conceptual proofs of  $L \log L$  criteria
- 1205 Robin Pemantle, Maximum variation of total risk
- 1206 Robin Pemantle & Yuval Peres, Galton-Watson trees with the same mean have the same polar sets
- 1207 Robin Pemantle, A shuffle that mixes sets of any fixed size much faster than it mixes the whole deck

**1208 Itai Benjamini, Robin Pemantle & Yuval Peres**, Martin capacity  
for Markov chains and random walks in varying dimensions

**1209 Wlodzimierz Bryc & Amir Dembo**, On large deviations of empirical  
measures for stationary Gaussian processes

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