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.
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 Joei 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 Cangolli, Rectangular arrays with fixed margins
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
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


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 trees

6. Persi W. Diaconis, Susan Holmes, Svante Janson, Steven P. Lalley, 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 $X_{n+1} = a_nX_n + b_n \pmod{p}$ 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?
15. Thomas S. Salisbury, Energy, and intersections of Markov chains

16. Paul Erdős, Svante Janson, Tomasz Łuczak and Joel Spencer, A note on triangle-free graphs

LIST OF MANUSCRIPTS PUBLISHED IN THE IMA PREPRINT SERIES UNDER AFOSR SPONSORSHIP

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

1189 Frank H. Shaw & Charles J. Geyer, Constrained covariance component models

1193 Svante Janson, Random regular graphs: Asymptotic distributions and contiguity

1197 Steven P. Lalley, Random series in inverse Pisot powers

1200 János Pach, Farhad Shahrokhi & Mario Szegedy, Application of the crossing number

1202 Joel Spencer, The Erdős-Halanani 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
AIR FORCE OF SCIENTIFIC RESEARCH (AFSC)
NOTICE OF TRANSMITTAL TO DTIC
This technical report has been reviewed and is
approved for public release IAW AFR 190-12
distribution in unlimited.
Joan Boyce
STINFO Program Manager