

# Fifth International Conference on Mathematical Modelling

29-31 July 1985  
University of California, Berkeley  
Berkeley, California U.S.A.

Reply to:

Prof. Xavier J. R. Avula  
Institute for Applied Sciences  
- Branch Office  
P.O. Box 1488  
Rolla, MO 65401 USA

Date: **DEC 24 1984**

Dr. N. V. Joshi  
Center for Theoretical Studies  
Indian Institute of Science  
Bangalore - 560012  
INDIA

Tel: (314)-341-4585

Dear Colleague:

The abstract/ ~~full length paper~~ entitled

Evolution of Optimal Sex Ratios in Social Insects:  
Some Mathematical Models

by Joshi and Gadagkar

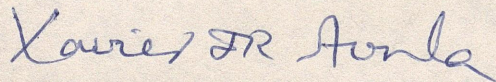
has been received. The decision regarding its acceptance for presentation at the Fifth International Conference will be reported to you in the last week of February 1985.

If you are considering submission of your paper for the best paper award, please send me the full length manuscript before ~~January~~ <sup>MARCH</sup> 31, 1985. The best paper awards will be announced in June 1985, and the awards will be presented during the conference banquet on July 30, 1985.

The deadline for receiving abstracts has been extended to January 31, 1985. However, the decision on acceptance will be mailed to you as announced earlier.

I look forward to meeting you in Berkeley in July.

Yours sincerely,



Xavier J. R. Avula  
Co-chairman, Fifth ICM

# Fifth International Conference on Mathematical Modelling

29-31 July 1985  
University of California, Berkeley  
Berkeley, California U.S.A.

June 4, 1985

Reply to:

Xavier J. R. Avula  
Institute for Applied Sciences  
- Branch Office  
P. O. Box 1488  
Rolla, Missouri 65401 U.S.A.  
Ph: (314)-341-4585 (Office)  
(314)-364-3581 (Home)

RE: Evolution of Optimal Sex Ratios in Social Insects:  
Some Mathematical Models

N. V. Joshi and Raghavendra Gadagkar  
Indian Institute of Science, Bangalore Ind

The above referred to paper is scheduled for presentation

Wednesday, July 31, 1985 in the

Morning Session 8:30 -12:30 at 11:20 - 11:40

Place: 120 Bechtel

Please inform your co-author(s), if applicable.

Please have your biographical information available to your session chairperson 10 minutes before your session begins.

Overhead projectors and 35 mm slide projectors will be available, and audio-visual operators will be present in the lecture halls to help you.

The complete conference program will be sent to you on June 15.

I am pleased to inform you that Pergamon Press has agreed to publish the conference proceedings after the conference. Only those papers which are presented by the registered participants will be included in the proceedings. Special mats for typing the manuscript and instructions will be mailed to the registered authors within the next few weeks.

The official conference banquet will be held Tuesday, July 30 at 6:30 P.M. in the Great Hall of the Faculty Club, University of California, Berkeley. Dr. Kenneth Haughton, Dean of Engineering, University of Santa Clara, California and formerly the Technical Director of IBM-San Jose will be the featured speaker. Awards

over ....

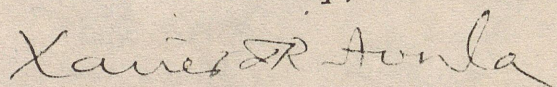
for best papers will be given at the banquet. If you wish to sign up for the banquet, please do so soon by indicating on your registration form, or by writing to me.

In my previous communication (General Information pamphlet) to you the telephone number of Hotel Durant was in error. The correct number is (415)-845-8981. I regret the error.

Please pre-register to help us plan efficiently. Make your housing arrangements promptly. The blocked out rooms will be released to the public if reservations are not made within the dates specified in the General Information pamphlet I had sent to you earlier.

If you have not pre-registered please use the following application form. I am looking forward to meeting you.

Yours sincerely,



Xavier J. R. Avula  
Co-chairman, Fifth ICMM

### CONFERENCE REGISTRATION FORM

<u>Name- Last</u>	<u>First</u>	<u>Middle</u>	<u>Fee Schedule</u>
<u>Title</u>			<input checked="" type="checkbox"/> \$200 before June 30, 1985
<u>Affiliation</u>			<input checked="" type="checkbox"/> \$260 June 30 - July 15, 1985
<u>Address</u>			<input checked="" type="checkbox"/> \$275 After July 15, 1985 and at the conference.
			<input checked="" type="checkbox"/> \$30 Conference Banquet on July 30, 1985
<u>City</u>	<u>State</u>	<u>ZIP</u>	Make checks or drafts payable to <u>'Fifth ICMM'</u> .
<u>Send Conference Registration Form to:</u>			All funds must be paid in U.S. Dollars.
Fifth ICMM			Foreign transactions must be done through a bank physical located in the U.S.A.
Institute for Applied Sciences			
31 Nantucket Lane			
St. Louis, Missouri 63132 USA			
			TOTAL PAYMENT ENCLOSED: \$ _____

## GUIDELINES FOR THE SUBMISSION OF ABSTRACTS

1. The entire abstract including title, author(s), institution, country and acknowledgements should fit within the rectangle.
2. The abstract should be as informative as possible:
  - a) state the specific object of study
  - b) state methods used
  - c) summarize the main results
  - d) state the conclusions
3. Type carefully, preferably on an electric typewriter. Clean keys and use a reasonably new good quality BLACK ribbon (a new ribbon may smudge -- an old one may be too faint).
4. Practice typing the abstract in a rectangle 18 x 12 cm on plain paper before using the form.
5. Standard abbreviations may be used, specific abbreviations should be defined.
6. The abstract will be reproduced in the Volume of Abstracts exactly as submitted. Therefore avoid corrections, smudges, errors and misspellings.
7. Air mail your abstract including 4 clear photocopies with card-board backing to:

Dr. Ch. Czoppelt  
Congress Secretary  
10th International Congress IUSSI  
Max-Planck-Institut für Biochemie  
D-8033 Martinsried  
West Germany

Deadline for receipts of abstracts: March 31, 1986.

8. To be presented  
 within topic No. \_\_\_\_\_ (Sociogenetics in Insects)  
 as free communication
9. If the abstract is accepted for oral presentation, the following equipment will be needed. Please mark the relevant box(es).  
 Blackboard    Slide projector    Movie projector    Overhead projector    Epidiascope
10. Please state below the name and address of the presenting author:

Name N. V. Joshi  
Address Centre for Theoretical Studies, Indian Institute of Science,  
Bangalore 560012, India.

Type single space  
No paragraphs

### ABSTRACT FORM

Use full width of frame  
Do not type outside the frame

#### TESTING SEX-RATIO THEORY WITHIN SOCIAL INSECTS

N.V. Joshi  
Centre for Theoretical Studies  
Indian Institute of Science, Bangalore-560012, India.

The optimal sex ratio in a species of social insects is a function of several life history characteristics of the species such as queen/worker control, single/multiple mating, extent of local mate competition etc. A mathematical model which predicts the optimal sex ratio under the simultaneous influence of these parameters is presented. Sensitivity of the optimal sex ratio to variations in these parameters is discussed which highlights the difficulties of testing sex ratio theories from field data. The effect of finite brood size on the optimal sex ratio is explored. Under partial inbreeding, stochastic variations in the realized sex ratio lead to a reduction in the female bias, compared to the infinite brood case. A curious situation where an increasing in inbreeding leads to an increase in the proportion of males is presented. Most theoretical investigations on optimal sex ratios assume infinite populations. However, in finite populations, due to drift, suboptimal sex ratios go to fixation with nonzero probability. The extent to which populations of different sizes depart from optimality, as investigated by computer simulations, is discussed.

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N. V. Joshi

Centre for Theoretical Studies, Indian Institute of Science,  
Bangalore 560012, India.

TESTING SEX-RATIO THEORY WITHIN SOCIAL INSECTS

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