SOCIETY for INDUSTRIAL and APPLIED MATHEMATICS

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INSTRUCTIONS

(For Contributed Papers and Poster Presentations)

1. Please use an elite typing element and carbon ribbon, if available.
2. Begin typing the abstract title, text, and author information directly below the heading captions. Type flush left, single-spaced within the space designated. Do not indent. (See enclosed sample.)
3. Abstract title should be underlined. Capitalize the first letter of all words, except articles, prepositions and conjunctions.
4. Abstract should not exceed 100 words. Please state the problems to be addressed, their relevance, the methodology and results. References, if necessary, should be in the body of the abstract. Formulas should be kept to a minimum—please, no vertical fractions, multiple subscripts, or handwritten symbols. Abstracts must be submitted on this form and will be printed as received. Errors in the text are the author's responsibility.
5. For two or more authors of the same affiliation and address, type the latter only once, directly below the authors' names.

IMPORTANT: ABSTRACTS MUST BE MAILED UNFOLDED.

PLEASE ANSWER THE FOLLOWING:

1. **Your preference for presentation.**
   Check one:
   (See reverse side for explanation)
   _____ Prefer Standard Presentation.
   __X__ Prefer Poster Presentation.

2. **Visual Equipment**
   Standard Presentation
   _____ Overhead Projector
   One_____ Two_____
   _____ 2"x2" Slide Projector
   Other _____ None_____

   Poster Presentation
   __X__ Corkboard
   _____ Easel for Flip Chart
   Other _____ None_____

3. **Subject Classification**
   (Choose one or two from list on reverse side)
   68 51

Robot Path Planning Using an Almost Euclidean Medial-Axis Derived by Grassfire

This paper describes a fast spatial modeling technique for robot trajectory planning.

Presented is a technique for deriving the Medial-Axis of a flat region. The method is based on the octagonal distance transformation, a variable neighborhood grassfire algorithm which can be implemented in parallel. The octagonal metric is adjusted, based on geometric knowledge and local gradient information, to produce an approximately Euclidean Medial-Axis, which is robust with respect to rotation and translation. This adjusted axis is then used to plan trajectories for a mobile object moving among obstacles.

Parallel computation can enable real-time robot control using the method presented. The robot's path need not be confined to the medial-axis.

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Deadline for Submission of Abstract
March 4, 1985

(PLEASE COMPLETE PAGE 2)

ABSTRACT FORM

1. Name and date(s) of meeting/conference: SIAM CONFERENCE ON GEOMETRIC MODELING AND ROBOTICS JULY 15-19, 1985

2. SIAM Member: Yes_____ No X

   Other society memberships: IEEE

3. If more than one author, who will present paper? JOHN CROSSCOPE

PRESENTATION INFORMATION

Standard

Normally, contributed papers (standard presentation) are 12 minutes long with 3 additional minutes for questions and answers. Speakers should use overhead projectors rather than a blackboard. Vugraph transparencies should be carefully prepared. The contents should be confined to the principal points of the presentation, using a maximum of 8 lines per transparency. Use clear, large handwriting or large typeset letters to ensure clarity. Avoid the use of many equations—a full screen of equations can lose the audience. To the extent possible, contributed papers will be organized into sessions according to subject matter. Each speaker has an obligation to make himself/herself known to the chairperson at least one hour in advance of their presentation.

Poster

Authors must make themselves available to the audience for approximately 1½ to 2½ hours, during which time they explain their work and discuss it in-depth. Authors should utilize visual aids, such as illustrations on 8½"x11" sheets for mounting on a corkboard approximately 4'x6', or on flip charts for mounting on easels approximately 27"x34". Poster Presentations foster interaction between speakers and attendees and enable attendees to review the material at their own pace. Normally, all authors requesting time for a poster presentation will be accommodated.

Guidelines

- Poster Presentations should be based on displayed materials.
- A concise statement of the problem and the results should be a conspicuous part of the display.
- The display should take advantage of the fact that the presentation need not be "linearly ordered" as a talk or written paper must be. For example, arrows directing the viewer to various parts of the display and color coding of different aspects of the work may be used to advantage.

SUBJECT CLASSIFICATION SCHEME

Sections 00—94 are the major headings from the 1980 Mathematics Subject Classification; a detailed listing of the scheme can be found in annual index issues of *Mathematical Reviews*, starting with volume 56, December 1978.

00 General
01 History and biography
03 Mathematical logic and foundations
04 Set theory
05 Combinatorics
06 Order, lattices, ordered algebraic structures
08 General mathematical systems
10 Number theory
12 Algebraic number theory, field theory and polynomials
13 Commutative rings and algebras
14 Algebraic geometry
15 Linear and multilinear algebra, matrix theory
16 Associative rings and algebras
17 Nonassociative rings and algebras
18 Category theory, homological algebra
20 Group theory and generalizations
22 Topological groups, Lie groups
26 Real functions
28 Measure and integration
30 Functions of a complex variable
31 Potential theory
32 Several complex variables and analytic spaces
33 Special functions
34 Ordinary differential equations
35 Partial differential equations
39 Finite differences and functional equations
40 Sequences, series, summability
41 Approximations and expansions
42 Fourier analysis
43 Abstract harmonic analysis
44 Integral transforms, operational calculus
45 Integral equations
46 Functional analysis
(47) Operator theory
(49) Calculus of variations and optimal control; optimization
(51) Geometry
52 Convex sets and related geometric topics
(53) Differential geometry
(54) General topology
55 Algebraic topology
57 Manifolds and cell complexes
58 Global analysis, analysis on manifolds
60 Probability theory and stochastic processes
62 Statistics
65 Numerical analysis
(68) Computer science (including automata)
70 Mechanics of particles and systems
73 Mechanics of solids
76 Fluid mechanics
78 Optics, electromagnetic theory
80 Classical thermodynamics, heat transfer
81 Quantum mechanics
82 Statistical physics, structure of matter
83 Relativity
85 Astronomy and astrophysics
86 Geophysics
90 Economics, operations research, programming, games
92 Biology and behavioral sciences
(93) Systems theory; Control
94 Information and communication, circuits
96 Mathematical Education, Elementary
97 Mathematical Education, Secondary
98 Mathematical Education, Collegiate
99 Unclassified or late

Send completed form to: SIAM, Attention: Conference Coordinator, 117 South 17th Street, 14th Floor, Philadelphia, PA 19103, U.S.A.

Abstract form must be mailed unfolded. Please mark your envelope "DO NOT BEND."