

Journal Of Differential Geometry

J. A. Montaldi, <i>Surfaces in 3-space and their contact with circles</i>	109
B. White, <i>Infima of energy functionals in homotopy classes of mappings</i>	127
S. Wolpert, <i>Thurston's Riemannian metric for Teichmüller space</i>	143
U. Abresch & J. Langer, <i>The normalized curve shortening flow and homothetic solutions</i>	175
K. Shiohama, <i>An integral formula for the measure of rays on complete open surfaces</i>	197

JOURNAL OF DIFFERENTIAL GEOMETRY

Editors

PHILLIP A. GRIFFITHS
Duke University
Durham, North Carolina 27706

C. C. HSIUNG
Lehigh University
Bethlehem, Pennsylvania 18015

H. BLAINE LAWSON, JR.
State University of New York
Stony Brook, New York 11794

RICHARD M. SCHOEN
University of California
La Jolla, California 92093

Y. T. SIU
Harvard University
Cambridge, Massachusetts 02138

S. T. YAU
University of California
La Jolla, California 92093

Associate Editors

MICHAEL M. FREEDMAN
University of California
La Jolla, California 92093

RICHARD B. MELROSE
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

DAVID MUMFORD
Harvard University
Cambridge, Massachusetts 02138

ROGER PENROSE
University of Oxford
Oxford, England OX1 3LB

DAVID RUELLE
Institut des Hautes Études Scientifiques
91440 Bur-Sur-Yvette, France

The Journal of Differential Geometry, published bimonthly by Lehigh University in January, March, May, July, September and November, is devoted to the publication of research papers in differential geometry and related subjects such as differential equations, mathematical physics, algebraic geometry and geometric topology. It is the policy of the editorial board to publish papers within four to six months of acceptance.

The subscription price for Vols. 23–24 (1986) is \$190.00 list, \$48.00 for personal use of individuals; each volume consists of three numbers. Back number prices per volume (with a 40% reduction for members of the American Mathematical Society): Vols. 1–2 (1967–1968), \$21.00; Vols. 3–6 (1969–1972), \$27.00; Vols. 7–9 (1972–1974), \$36.00; Vol. 10 (1975), \$45.00; Vol. 11 (1976), \$52.00; Vol. 12 (1977), \$60.00; Vols. 13–15 (1978–1980), \$63.00; Vol. 16 (1981), \$72.00; Vol. 17 (1982), \$78.00; Vols. 18–20 (1983–1984), \$120.00, Vols. 21–22 (1985), \$135.00.

Subscriptions and orders should be addressed to the American Mathematical Society, P. O. Box 1571, Annex Station, Providence, Rhode Island 02901-1571. *All orders must be accompanied by payment, and check should be made*

payable to the American Mathematical Society. General correspondence and changes of address should be sent to the American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940.

Instructions for submission of manuscripts are given inside of the back cover of this issue.

Copyright © 1986 Lehigh University. All rights reserved.

ISSN 0022-040X

Printed in the United States of America

The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability