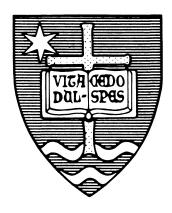
## Notre Dame JOURNAL of FORMAL LOGIC



VOLUME 25, NUMBER 1 JANUARY 1984

PUBLISHED QUARTERLY BY THE UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA

## NOTRE DAME JOURNAL OF FORMAL LOGIC

Editors: Ernest LePore Penelope Maddy Mark É. Nadel

Consulting Editors: Phillip Bricker Elliott Mendelson V. Frederick Rickey Howard Wettstein Paul Young

Business Manager: Michele Daugherty

## VOLUME 25, NUMBER 1, JANUARY 1984

## **CONTENTS**

Tense logic and time. By Johan van Benthem	1
Decomposable collections of sets. By Barry Burd	17
The nature of reflexive paradoxes: Part II.  By Leonard Goddard	27
The necessity of the past and modal-tense logic incompleteness.  By Michael J. White	59
Vector spaces and binary quantifiers.  By Michał Krynicki, Alistair Lachlan, and Juoko Väänänen	72
Opposition. By George Englebretsen	79
First-order theories as many-sorted algebras.  By V. Manca and A. Salibra	86
Notre Dame Journal of Formal Logic is published quarterly by the University of No Dame in January, April, July, and October of each year. The Journal is composed by Belja Ltd., Dexter, Michigan and printed by Cushing-Malloy, Inc., Ann Arbor, Michigan. Secon class postage paid at Notre Dame, Indiana 4656	an,

class postage paid at Notre Dame, Indiana 46556.

Subscriptions are \$35.00 per year for institutions and \$20.00 for individuals. Back volumes are \$20.00 each for Volumes 1-10 and \$35.00 each for Volumes 11-24. Orders for subscriptions and back volumes (accompanied by payment) and changes of address should be sent to the Business Manager, P.O. Box 5, Notre Dame, Indiana 46556, U.S.A.

Copyright © 1984 by the University of Notre Dame. All rights reserved.

Coden: NDJFAM.

Notre Dame Journal of Formal Logic . . . . . . . . . . . . . . . . (ISSN 0029-4527)