Editorial Advisory Committee

MANSON BENEDICT DEAN BROWN E. RICHARD COHEN E. C. CREUTZ FRANK G. DAWSON O. E. DWYER PAUL GAST D. H. GURINSKY A. F. HENRY D. G. HURST A. A. JOHNSON
L. W. NORDHEIM
HUGH C. PAXTON
FRED W. THALGOTT

ANS Officers

JOHN W. LANDIS President JAMES R. LILIENTHAL Vice President/President Elect J. ERNEST WILKINS, JR. Treasurer RAYMOND D. MAXSON Assistant Treasurer OCTAVE J. DU TEMPLE **Executive Secretary**

ANS Publications Staff

NORMAN H. JACOBSON Publications Manager RUTH FARMAKES Assistant Staff Editor KATHRYN L. FROEHLICH Copy Editor SIEGFRIED H. KRAPP Production Manager LINDA A. DOLBY Production Assistant

Composition

BELJAN, ANN ARBOR, MICH.

BELJAN, ANN ARBOR, MICH.

NUCLEAR SCIENCE AND ENGINEERING is published monthly by the American Nuclear Society, Incorporated, with executive and business offices at 244 East Ogden Avenue, Hinsdale, Illinois 60521—telephone 312/325-1991. Subscription rate is \$110/4 volumes, calendar year; \$30/single volume: Volumes 43, 44, 45 and 46 will be published during 1971: single copy price is \$13 (special issues slightly higher): address subscription orders to the American Nuclear Society (back issues of Volumes 1-17 are available from Academic Press, 111 Fifth Avenue, New York, N.Y.). Second-class postage is paid at Hinsdale, Illinois and at additional mailing offices. NUCLEAR SCIENCE AND ENGINEERING is printed in Danville, Illinois, Copyright © 1971 by the American Nuclear Society, Inc. Inquiries about the distribution and delivery of NUCLEAR SCIENCE AND ENGINEERING and requests for changes of address should be directed to the publisher, the American Nuclear Society, 244 East Ogden Avenue, Hinsdale, Illinois 60521. Allow 6 weeks for a change to become effective.

NUCLEAR SCIENCE and ENGINEERING

VOL. 45 NO. 2 **AUGUST 1971**

Contents

TECHNICAL PAPERS

A Method for Solving Time-Dependent Electron	
Transport Problems	107
Beam Enrichment by the Multilayered Neutron-	
Reflecting Conical Tube T. Shimooke	117
Slow-Neutron Scattering by Light and Heavy Water	
Yorio Gotoh and Hiroshi Takahashi	126
Neutron Spectra and Kinetic Properties in Fast	
Subcritical Assemblies Containing Uranium-235,	
Uranium-238, and Carbon P. d'Oultremont,	
J. C. Young, J. M. Neill, and C. A. Preskitt	141
The Degenerate Kernel Technique and Neutron	
Thermalization Calculations in Asymptotic	
Reactor Theory.	450
Paul J. Turinsky and James J. Duderstadt	156
Applications of the Degenerate Kernel Technique	
to Thermal Neutron Spectra Calculations	105
Paul J. Turinsky and James J. Duderstadt	167
P ₁ Blackness Theory for Infinite Cylinders	100
M. R. Mendelson and M. L. Storm	182
Solution of the Neutron Diffusion Equation by	
Space-Energy Factorization	189
Optimal Control of Nuclear Reactor Depletion	109
David C. Wade and William B. Terney	199
Davia C. Wade and William B. 1erney	199
TECHNICAL NOTES	
Radiation Effects on Superheating of Liquid So-	
dium L. W. Deitrich	218
Application of the Spectral Synthesis Method to the	
Analysis of Spatially Dependent Fast-Reactor	
Transients	221
Analytic Solution to the Flat Flux Problem	
William B. Terney	22 6
Calculations of Thermal-Neutron Group Constants	
During Burnup of Light-Water-Moderated Lat-	
tices	230
BOOK REVIEWS	233
	