UNIVERSITY of PENNSYLVANIA

SCHOOL OF MEDICINE

DEPARTMENTS OF RADIATION THERAPY
University of Pennsylvania
and
The Fox Chase Cancer Center
Martin D. Altschuler, Ph.D.

Mailing Address:
Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, Pennsylvania 19104

(215) 662- 6472/3084

11th September 1985

Professor Robert Kalaba
Dr. John L. Casti
Editor, Applied Mathematics and Computation
Departments of Economics and Biomedical Engineering
University of Southern California
Los Angeles, California 90007

Dear Sirs:

Enclosed please find three copies of our paper: A Computational Solution of the Inverse Problem in Radiation Therapy Treatment Planning by Y. Censor, M.D. Altschuler, and W.D. Powlis, which we submit for publication in your journal Applied Mathematics and Computation.

Sincerely yours,

Martin D Altschuler

Martin D. Altschuler

MDA/amr
cc:

ELSEVIER SCIENCE PUBLISHING CO., INC.
ELSEVIER NORTH-HOLLAND ELSEVIER BIOMEDICAL EXCERPTA MEDICA
52 VANDERBILT AVENUE, NEW YORK, NY 10017 (212) 867-9040

Dr. Martin D. Altschuler
Department of Radiation Therapy
University of Pennsylvania
School of Medicine
Philadelphia, PA 19104

Date: 11-04-86
Ms# 86-044

From the Editor
I am pleased to inform you that your article has been accepted for publication.

From the Publisher
Under the new U.S. Copyright Law effective January 1978, formal written transfer of copyright on each article from the author(s) is needed. This transfer allows the Publisher to provide for the widest possible dissemination of the article through activities such as distribution of reprints; authorization of reprints, translations, or photocopies by others; production of microform editions; and authorization of indexing and abstracting services in print and data-base formats. Without this transfer of copyright, such activities by the Publisher and the corresponding spread of information are limited. *Therefore, we ask that you complete and return the original copy of this form promptly to our address noted above (ATTN: Desk Editorial).*

Your cooperation is essential and appreciated.

TRANSFER OF COPYRIGHT AGREEMENT

Copyright to the article entitled: A Computational Solution of the Inverse Problem in Radiation Therapy Treatment Planning

to be published in the journal Applied Mathematics and Compuation

is hereby transferred to Elsevier Science Publishing Co., Inc. However, the authors reserve the following:

1. All proprietary rights other than copyright, such as patent rights.
2. The right to use all or part of this article in future works of their own.

M.D. Altschuler
Signature

M.D. ALTSCHULER
Name (printed)

Title (if an employer, not the author)

11 NOV 1986
Date

William D Powlis
Signature

WILLIAM D POWLIS
Name (printed)

Title (if an employer, not the author)

Nov 12, 1986
Date

To be signed by at least one of the authors (who agrees to inform the others, if any) or, in the case of a "Work made for hire", by the employer.

Applied Mathematics and Computation
Volume 25, Issue 1 , January 1988, Pages 57-87

doi:10.1016/0096-3003(88)90064-1

This Document
Abstract
Abstract + References
PDF (1681 K)
Actions
Cited By
Save as Citation Alert
E-mail Article
Export Citation

A computational solution of the inverse problem in radiation-therapy treatment planning*1

Yair Censor

Martin D. Altschuler and William D. Powlis

Department of Mathematics and Computer Science University of Haifa Mt. Carmel Haifa 31999, Israel
Department of Radiation Therapy University of Pennsylvania School of Medicine Philadelphia, Pennsylvania 19104, USA

Available online 8 May 2002.

Abstract

Radiation therapy concerns the delivery of the proper dose of radiation to a tumor volume without causing irreparable damage to healthy tissue and critical organs. The forward problem refers to calculating the dose distribution that would be delivered to a measured patient cross-section when the radiation field generated by

the beam sources is specified. The inverse problem refers to calculating the radiation field that will provide a specified dose distribution in the patient. The forward and inverse problems of radiation-therapy treatment planning are first formulated in their continuous versions, and the point is made that, in this field of application, the inverse problem calls for the inversion of an operator for which no analytic closed-form mathematical representation exists. To attack the inverse problem under such circumstances, a discretized model is set up in which both patient section and radiation field are finely discretized. This leads to a linear feasibility problem, which is solved by a relaxation method. The paper includes full details of this new approach, with discussion of technical aspects such as dose apportionment, software development, and experimental results. Consequences and limitations as well as a precise comparison with other methodologies are also discussed.

---

*1 A preliminary report on this research was presented at the Eighth International Conference on the Use of Computers in Radiation Therapy, 9-12 July 1984, Toronto, Canada [24].

Applied Mathematics and Computation
Volume 25, Issue 1 , January 1988, Pages 57-87

This Document
- **Abstract**
- Abstract + References
- PDF (1681 K)

Actions
- Cited By
- Save as Citation Alert
- E-mail Article
- Export Citation

results list | previous | 5 of 5 | next

Home | Search | Journals | Books | Abstract Databases | My Profile | Alerts | Help