TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

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PDE-Based Radiotherapy Treatment Planning

in

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Abstract.

High-energy ionizing radiation is a prominent modality for the treatment of many cancers. The approaches to electron dose calculation can be categorized into semi-empirical models (e.g. Fermi-Eyges, convolution-superposition) and probabilistic methods (e.g. Monte Carlo). A third approach to dose calculation has only recently attracted attention in the medical physics community. This approach is based on the deterministic kinetic equations of radiative transfer. We derive a macroscopic partial differential equation model for electron transport in tissue. This model consists of a nonlinear system of hyperbolic differential equations with explicitly space-dependent flux, whose numerical solution is discussed. Several numerical results are shown.