

Modular Inverse Planning Software for IMRT Optimization Research

Inverse planning software entitled RAPTOR (Radiation Attenuator Planning Tools for Optimized Radiotherapy) is being developed for intensity modulated radiotherapy (IMRT) optimization research at The University of Texas M. D. Anderson Cancer Center. RAPTOR is modular in design for simple implementation of arbitrary cost functions, constraints, and new treatment strategies. The dose model is a Clarkson sector summation algorithm reformulated into Cartesian coordinates to provide geometric conformity to rectangular pencil beams. Primary and scattered dose to each point from all pencil beams is calculated. The model is relatively simple and thus is fast. Calculation speed on a 266 MHz Pentium II is 30 microseconds per point per pencil beam. The model does not presently account for heterogeneities or beam penumbra. A generalized Batho heterogeneity correction and penumbra model will be implemented in the near future. Treatment plans are optimized using a variation of simulated annealing developed at M. D. Anderson Cancer Center. RAPTOR is used as an adjunct to a commercial treatment planning system (TPS). Prior to optimization, patient anatomy information and, if necessary, the dose distribution of a prior or concomitant treatment are imported from the TPS. Following optimization, the resultant dose distribution is exported to the TPS for display. Results of intensity profiles and dose distributions will be demonstrated.

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