Optimization of weightings for the beams selected through forward-planning process

Inverse planning (IP) has stirred considerable excitement in the community. Its objective is to make the dose conform to the tumor while sparing other organs. Since IP is time-consuming and does not necessarily produce an ideal plan, we sought to achieve the same goal by an extension of conventional treatment planning techniques. The beam orientation and wedge angles were chosen in the conventional rule-based manner. However, within each beam's-eye view, we used multiple field openings. One field opening conformed to the tumor only, with an appropriate margin. The other field openings were smaller and served to reduce the dose to critical structures in the path of the larger opening. As the number of organs to be spared increases, the number of fields for each beam increases. Fortunately, there are very sound analytical tools for dealing with multiple fields, the Cimmino simultaneous projection method, etc…. We employed the method to obtain the optimized weighting for each field of each beam. We found that if the dose constraint for tumor and critical organ is reasonable, we were able to obtain a plan with a limited number of beams that satisfy the specified dose objective.