LECTURE 13: TREATMENT PLANNING - ISODOSE DISTRIBUTIONS

Problems

13.1 Two parallel-opposed $^{60}\text{Co}$ fields with a separation of 16 cm are used to deliver 60 Gy to a tumor encompassed by the 130% isodose curve. What is the dose delivered to each field at the depth of maximum dose?

13.2 Four coplanar $^{60}\text{Co}$ fields yield an isodose distribution that encloses a tumor within the 180% isodose curve. For a tumor dose of 60 Gy, what is the dose delivered at $d_{\text{max}}$ to each of the fields?

13.3 Four coplanar $^{60}\text{Co}$ fields yield an isodose distribution that encloses a tumor within the 150% isodose curve when the $d_{\text{max}}$ doses are weighted in the ratio of 100%, 80%, 75%, and 50%. Determine the dose at $d_{\text{max}}$ for each of the fields if the tumor dose is 45 Gy.

13.4 A four-field isocentric treatment configuration is used to deliver 50 Gy to a tumor over a course of 20 fractions, with two fields treated each day. The dose rate at the isocenter is 1.50 Gy/min for a 10 cm x 10 cm field. Output factors are 1.02 (12 cm x 12 cm) and 1.04 (15 cm x 15 cm).

Data for the four fields are:

- Field 1: 15 cm x 15 cm, 10 cm depth, TAR = 0.755
- Field 2: 15 cm x 15 cm, 12 cm depth, TAR = 0.686
- Field 3: 12 cm x 12 cm, 15 cm depth, TAR = 0.564
- Field 4: 12 cm x 12 cm, 16 cm depth, TAR = 0.535

What is the treatment time and tumor dose per treatment for each field if the treatment times are equal for all fields?

What is the treatment time for each field if the tumor doses are equal for all fields?