

Optimal Radiation Treatment Plan

■ TABLE 3.7 Data for the design of Mary's radiation therapy

Area	Fraction of Entry Dose Absorbed by Area (Average)		Restriction on Total Average Dosage, Kilorads
	Beam 1 b_1	Beam 2 b_2	
Healthy anatomy	0.4	0.5	Minimize
Critical tissues	0.3	0.1	≤ 2.7
Tumor region	0.5	0.5	$= 6$
Center of tumor	0.6	0.4	≥ 6

Minimize $H = 0.4b_1 + 0.5b_2$

s.t. $\left. \begin{array}{l} C: 0.3b_1 + 0.1b_2 \leq 2.7 \\ T: 0.5b_1 + 0.5b_2 = 6 \\ CT: 0.6b_1 + 0.4b_2 \geq 6 \end{array} \right\} \begin{array}{l} \times 10 \\ \text{for} \\ \text{simplicity} \end{array} \Rightarrow \begin{array}{l} 3b_1 + b_2 \leq 27 \\ 5b_1 + 5b_2 = 60 \\ 6b_1 + 4b_2 \geq 60 \end{array}$

Intercepts

b_1	b_2
9	27
12	12
10	15

