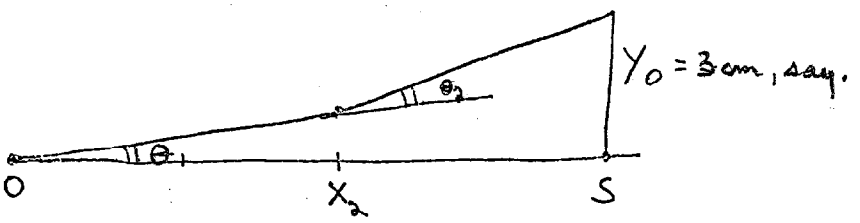
Lets see what can be done with two 200" septum systems. The final point s is now given as 1600", and we require a total deflection of 3 cm, say. We will want to optimize the extraction efficiency for this system.

We will assume the units have a uniform field, and the septum thicknesses are related to the field.

$$\frac{Bl}{P} = \theta = \frac{jtl}{P} \equiv \alpha t$$ We take the length l as fixed.



$$Y_0 = \alpha t_1 s + (s - X_2)\alpha t_2$$
$$t_2 = \alpha t_1 X_2$$

$$\therefore \quad Y_0 = \alpha t_1 \left(s + (s - X_2)\alpha X_2 \right)$$

This is a relation between t_1 and X_2, everything else being given.

i.e., $$t_1 = \frac{Y_0}{\alpha} \cdot \frac{1}{\left(s + (s - X_2)\alpha X_2\right)}$$

~~We want to find that~~ value of X_2 which minimizes t. This occurs again at $X_2 = s/2$.

$$t_1 = \frac{Y_0}{\alpha} \cdot \frac{1}{s + \frac{\alpha s^2}{4}}$$

We can now compute t_1.

$$\alpha = \frac{500 \text{ cm} \times 10^4}{6.67 \times 10^8} = .75 \times 10^{-2} \text{ cm}^{-1}$$

$$s = 3500 \text{ cm} \qquad \frac{\alpha s}{4} = 6.56$$

$$t_1 = \frac{1.33 \times \cancel{10}^{2}}{35.00\,(7.56)} Y_0 = .005\, Y_0$$

For $Y_0 = 2''$, $t_1 = 10$ mils.
$t_2 = 132$ mils.