

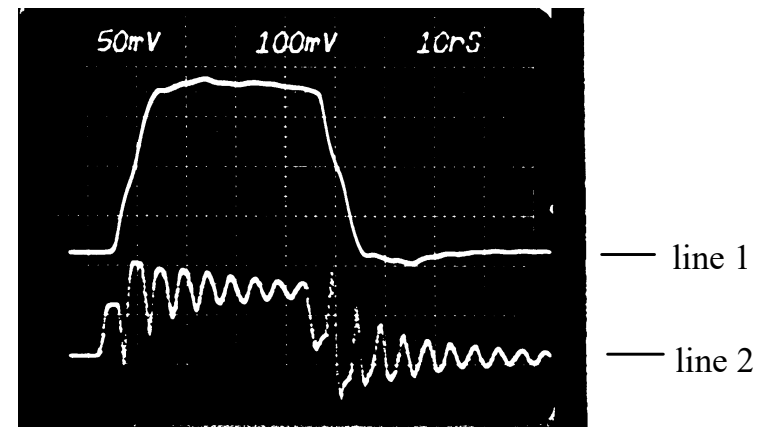
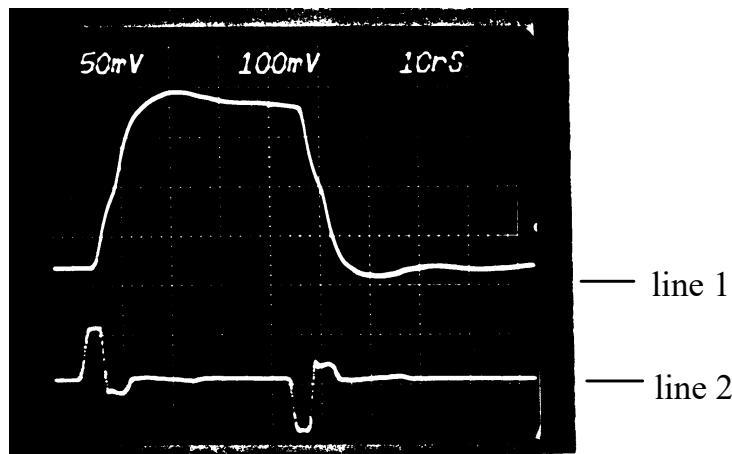
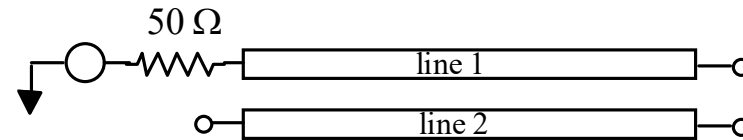
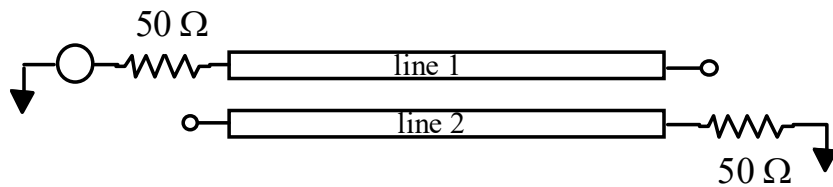
ECE 546

Two-Line Cases

Spring 2024

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Crosstalk noise depends on termination



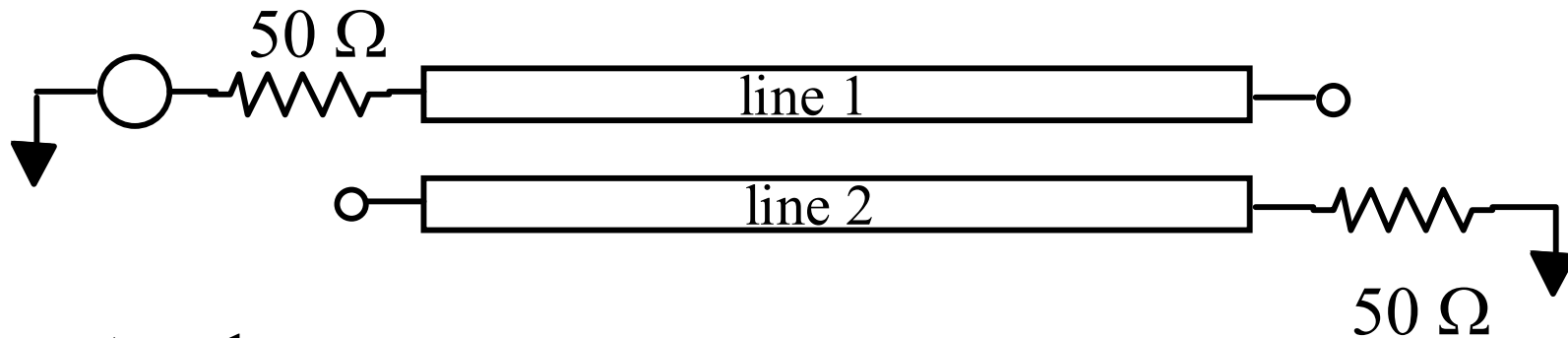
Try with

$$L(\text{nH/m}) = \begin{pmatrix} 377 & 131 \\ 131 & 377 \end{pmatrix}$$

$$C(\text{pF/m}) = \begin{pmatrix} 105 & -23 \\ -23 & 105 \end{pmatrix}$$

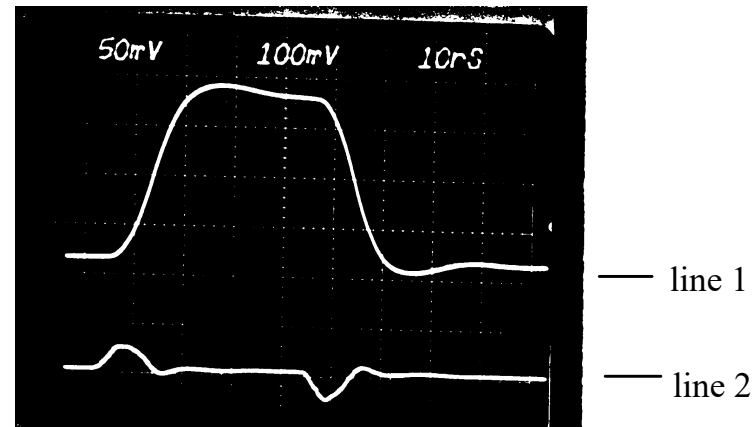
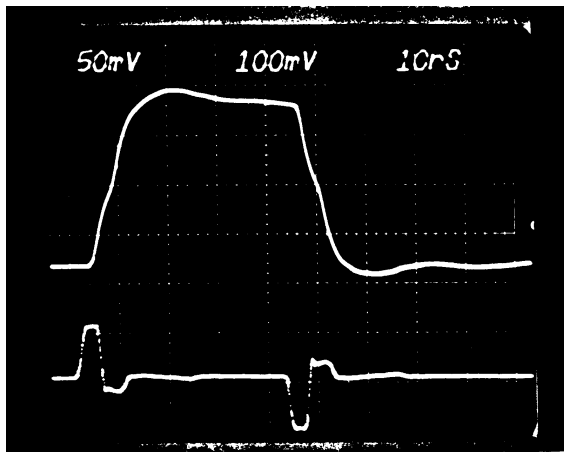
Line length= 14 inches

Crosstalk depends on signal rise time



$t_r = 1 \text{ ns}$

$t_r = 7 \text{ ns}$



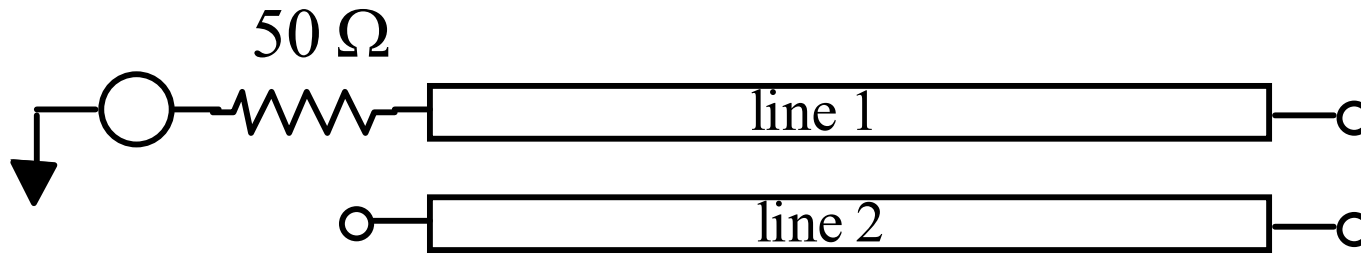
Try with

$$L(\text{nH/m}) = \begin{pmatrix} 377 & 131 \\ 131 & 377 \end{pmatrix}$$

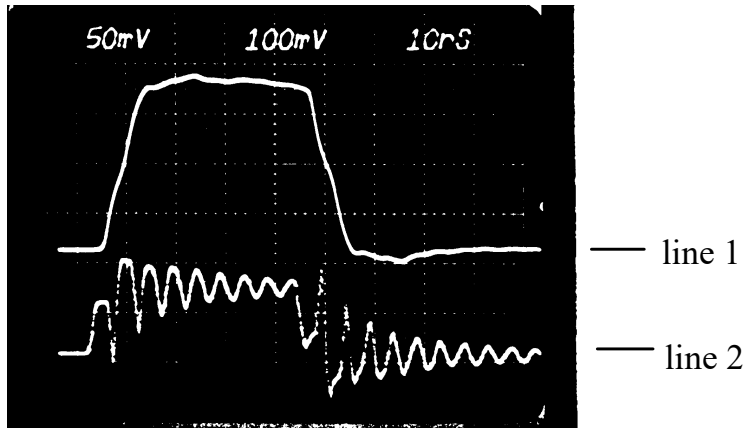
Line length = 14 inches

$$C(\text{pF/m}) = \begin{pmatrix} 105 & -23 \\ -23 & 105 \end{pmatrix}$$

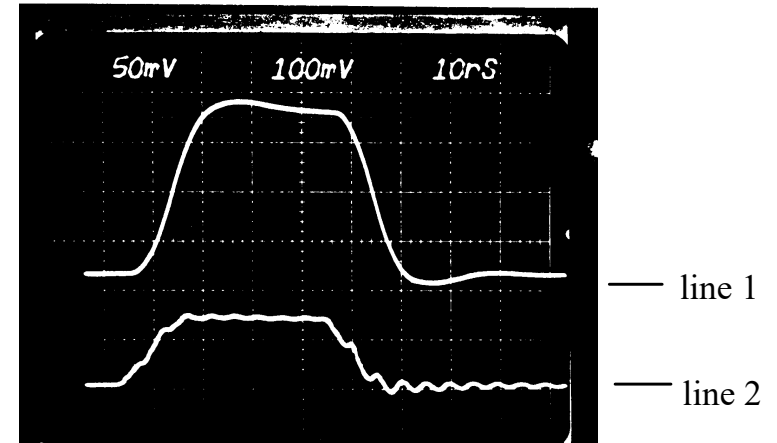
Crosstalk depends on signal rise time



$t_r = 1 \text{ ns}$



$t_r = 7 \text{ ns}$



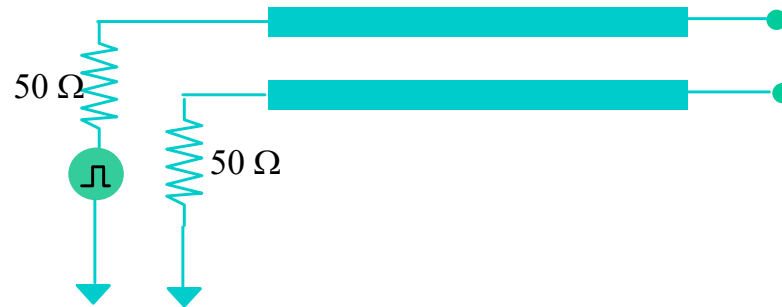
Try with

$$L(\text{nH/m}) = \begin{pmatrix} 377 & 131 \\ 131 & 377 \end{pmatrix}$$

$$C(\text{pF/m}) = \begin{pmatrix} 105 & -23 \\ -23 & 105 \end{pmatrix}$$

Line length= 14 inches

Microstrip vs Stripline



Microstrip (h = 8 mils)

$$w = 8 \text{ mils}$$

$$\epsilon_r = 4.32$$

$$L_s = 377 \text{ nH/m}$$

$$C_s = 82 \text{ pF/m}$$

$$L_m = 131 \text{ nH/m}$$

$$C_m = 23 \text{ pF/m}$$

$$v_e = 0.155 \text{ m/ns}$$

$$v_d = 0.178 \text{ m/ns}$$

Stripline (h = 16 mils)

$$w = 8 \text{ mils}$$

$$\epsilon_r = 4.32$$

$$L_s = 466 \text{ nH/m}$$

$$C_s = 86 \text{ pF/m}$$

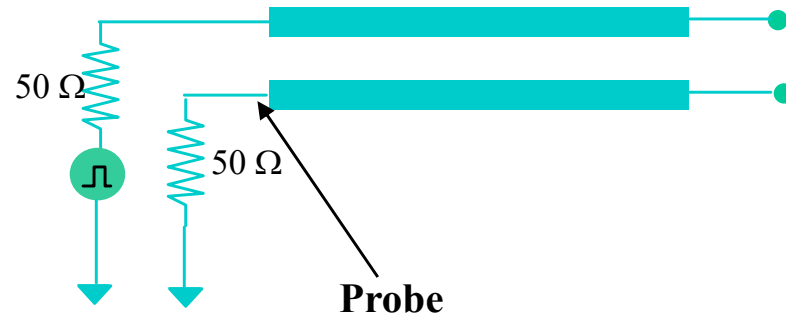
$$L_m = 109 \text{ nH/m}$$

$$C_m = 26 \text{ pF/m}$$

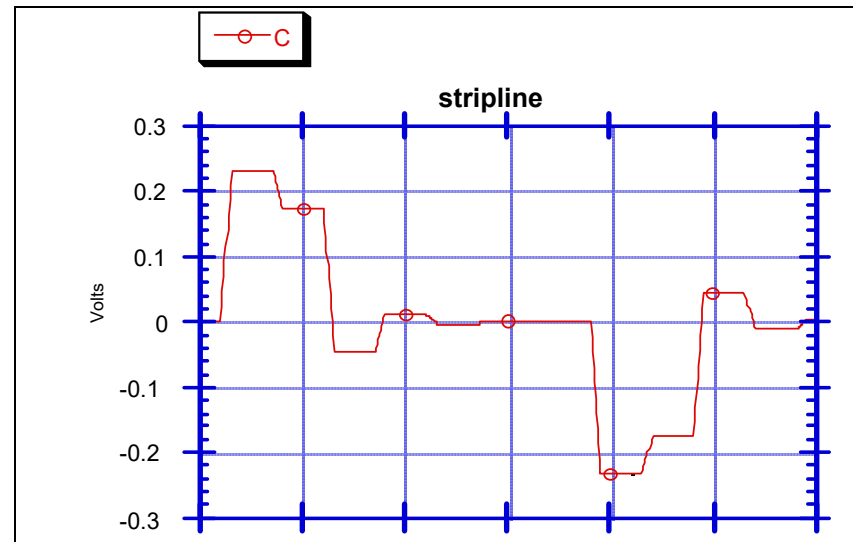
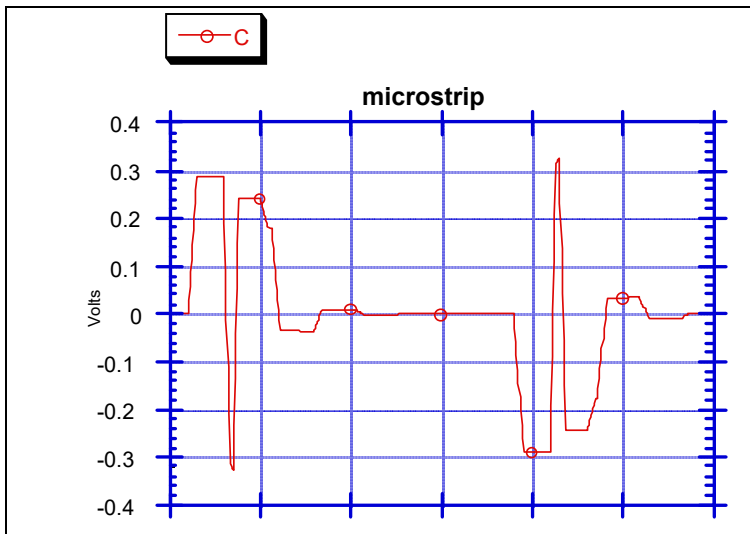
$$v_e = 0.142 \text{ m/ns}$$

$$v_d = 0.142 \text{ m/ns}$$

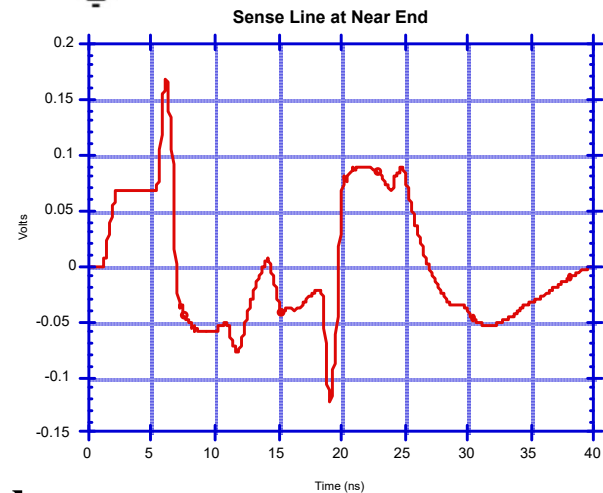
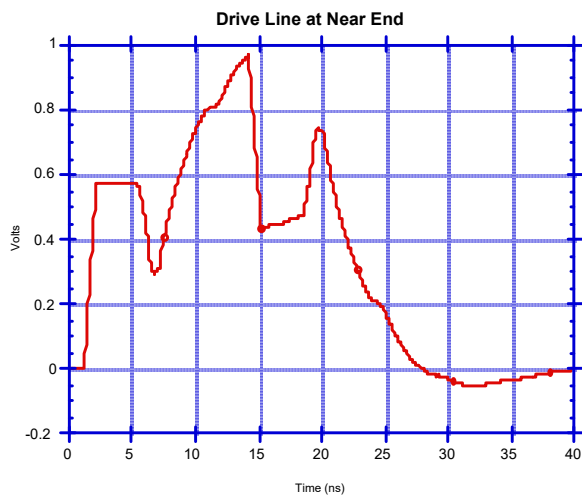
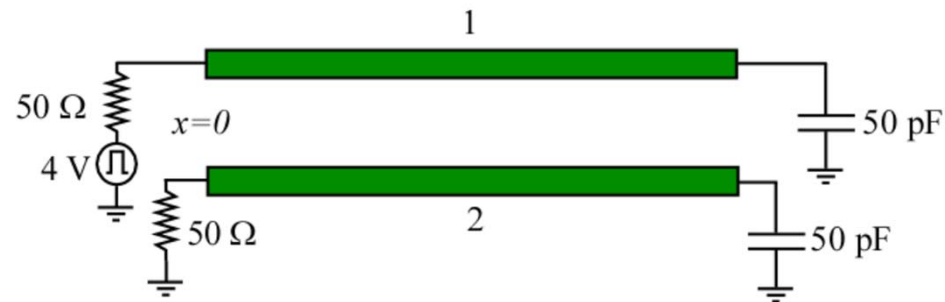
Microstrip vs Stripline



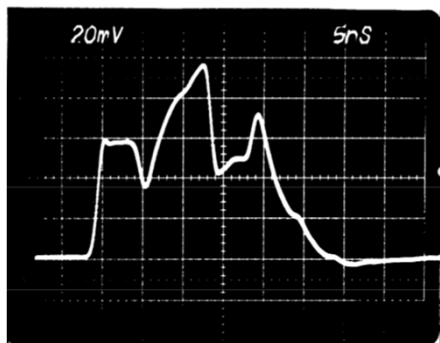
Sense line response at near end



Capacitive Terminations



Line length= 14 inches



$$L(\text{nH/m}) = \begin{pmatrix} 377 & 131 \\ 131 & 377 \end{pmatrix}$$

Try with

$$C(\text{pF/m}) = \begin{pmatrix} 105 & -23 \\ -23 & 105 \end{pmatrix}$$

