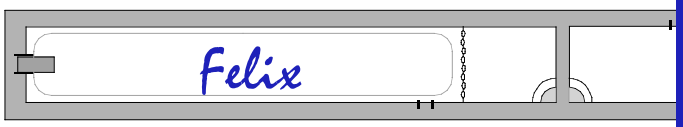
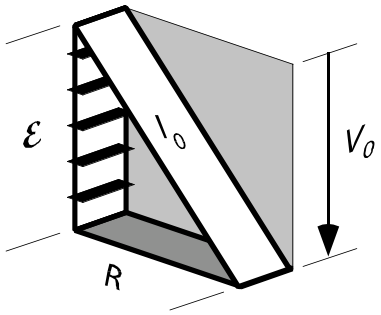
PhyzSpringboard: Another Slippery Affair



5-8: Parallel Slides

Develop equations for the characteristics of each slide in terms of the elevation $\mathcal{E}$ and run length R of slide 5.Then compare the expressions for the individual inclines (I_1, I_2, etc.) and tota incline of each slide to the original incline I_0 by means of a product (ex: $2I_0$) or quotient (ex: $I_0/3$). Repeat comparisons for power.

5.Yer Basic Slide (dig the groovy 3-D)

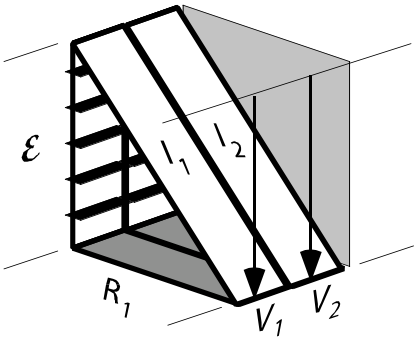


$V_0 = \mathcal{E}$

$I_0 = \mathcal{E}/R$

$P_0 = \mathcal{E}^2/R$

6. Slide-by-Slide ($R_1 = R_2 = R$)



$V_{TOT} = \mathcal{E}$

$I_{TOT} = 2\mathcal{E}/R = 2I_0$

$V_1 = \mathcal{E}$ $\quad V_2 = \mathcal{E}$

$P_{TOT} = 2\mathcal{E}^2/R = 2P_0$

$I_1 = \mathcal{E}/R = I_0$ $\quad I_2 = \mathcal{E}/R = I_0$

$P_1 = \mathcal{E}^2/R = P_0$ $\quad P_2 = \mathcal{E}^2/R = P_0$ $\quad R_{EQ} = R/2$

7. Make Mine a Triple ($R_1 = R_2 = R_3 = R$) (this time, *you* draw in the *V*'s and *I*'s)

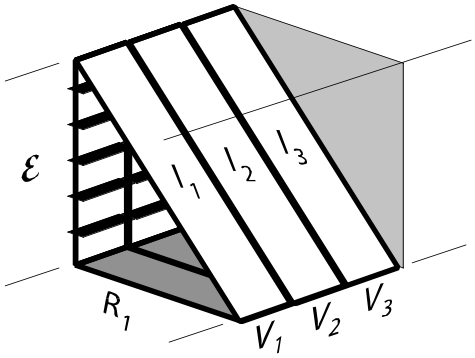


Diagram note: the gray "plank" R_2 is partially obscured; R_3 is completely blocked from view.

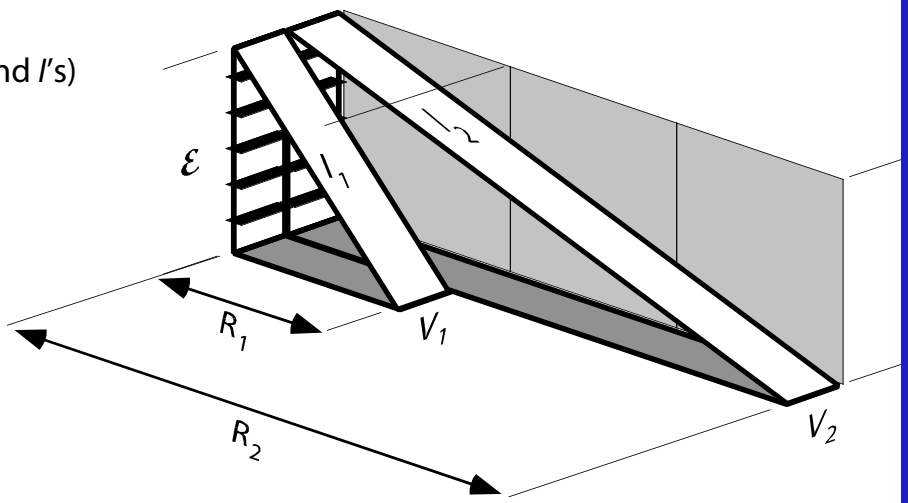
$V_{TOT} = \mathcal{E}$

$V_1 = \mathcal{E}$ $V_2 = \mathcal{E}$ $V_3 = \mathcal{E}$ $I_{TOT} = 3\mathcal{E}/R = 3I_0$

$I_1 = \mathcal{E}/R = I_0$ $I_2 = \mathcal{E}/R = I_0$ $I_3 = \mathcal{E}/R = I_0$ $P_{TOT} = 3\mathcal{E}^2/R = 3P_0$

$P_1 = \mathcal{E}^2/R = P_0$ $P_2 = \mathcal{E}^2/R = P_0$ $P_3 = \mathcal{E}^2/R = P_0$ $R_{EQ} = R/3$

8. Fast-or-Slow ($R_2 = 3R_1; R_1 = R$)
(this time, *you* draw in the *V*'s and *I*'s)



$V_1 = \mathcal{E}$ $V_2 = \mathcal{E}$ $V_{TOT} = \mathcal{E}$

$I_1 = \mathcal{E}/R = I_0$ $I_2 = \mathcal{E}/3R = I_0/3$ $I_{TOT} = 4\mathcal{E}/3R = (4/3)I_0$

$P_1 = \mathcal{E}^2/R = P_0$ $P_2 = \mathcal{E}^2/3R = P_0/3$ $P_{TOT} = 4\mathcal{E}^2/3R = (4/3)P_0$

$R_{EQ} = (3/4)R$