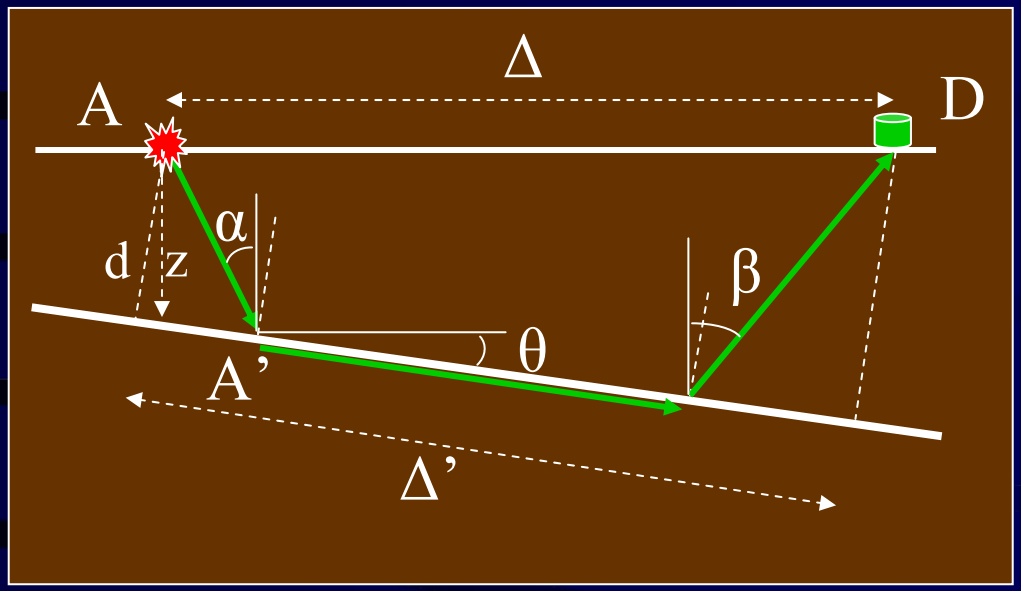
# Δομή στρώματος με κεκλιμένη την κάτω επιφάνεια




Κλίση
A ⟶ D

1

$$\hat{a} = \hat{i}_c - \hat{\theta}$$

$$\hat{\beta} = \hat{i}_c + \hat{\theta}$$

$$T_1 = \frac{\eta\mu\beta}{u_0}\Delta + \frac{z(\sigma\upsilon\nu\alpha + \sigma\upsilon\nu\beta)}{u_0}$$

Εξίσωση καμπύλης χρόνων διαδρομής

$$T_1 = \frac{\eta\mu(i_c+\theta)}{u_0}\Delta + \frac{z\sigma\upsilon\nu(i_c-\theta)}{u_0} + \frac{z\sigma\upsilon\nu(i_c+\theta)}{u_0}$$

$$T_1 = \frac{\eta\mu(i_c+\theta)}{u_0}\Delta + \frac{2z\sigma\upsilon\nu i_c\sigma\upsilon\nu\theta}{u_0}$$

$$d = z\sigma\upsilon\nu\theta$$

$$T_1 = \frac{\eta\mu(i_c + \theta)}{u_0}\Delta + \frac{2d\sigma\upsilon i_c}{u_0}$$

Ευθεία
T=f(Δ)

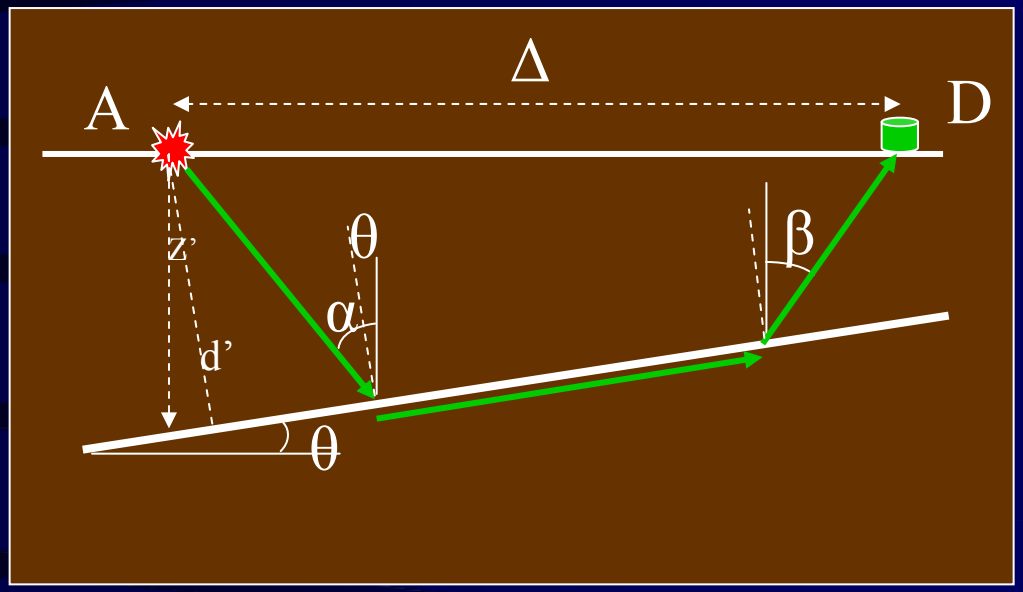
Κλίση της ευθείας

$$S_- = \frac{\eta\mu(i_c + \theta)}{u_0}$$

Νόμος Snell

$$u_0 = u_1\eta\mu i_c$$

$$S_- = \frac{\eta\mu(i_c + \theta)}{u_1\eta\mu i_c}$$




Κλίση
D → A

$$\hat{a} = i_c + \theta \qquad \hat{\beta} = i_c - \theta$$

$$T_1 = \frac{\eta\mu\beta}{u_0}\Delta + \frac{z\left(\sigma\upsilon\nu\alpha + \sigma\upsilon\nu\beta\right)}{u_0}$$

$$T_1' = \frac{\eta\mu(i_c - \theta)}{u_0}\Delta + \frac{z'\sigma\upsilon\nu(i_c + \theta) + z'\sigma\upsilon\nu(i_c - \theta)}{u_0}$$

$$T_1' = \frac{\eta\mu(i_c - \theta)}{u_0}\Delta + \frac{2d'\sigma\upsilon\nu i_c}{u_0}$$

Ευθεία
T=f(Δ)

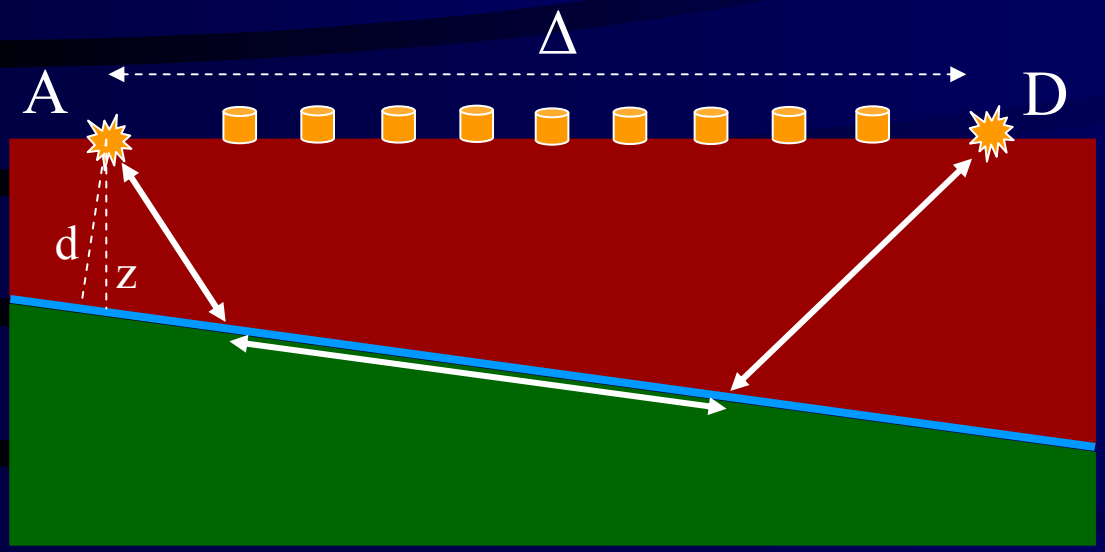
Κλίση της ευθείας

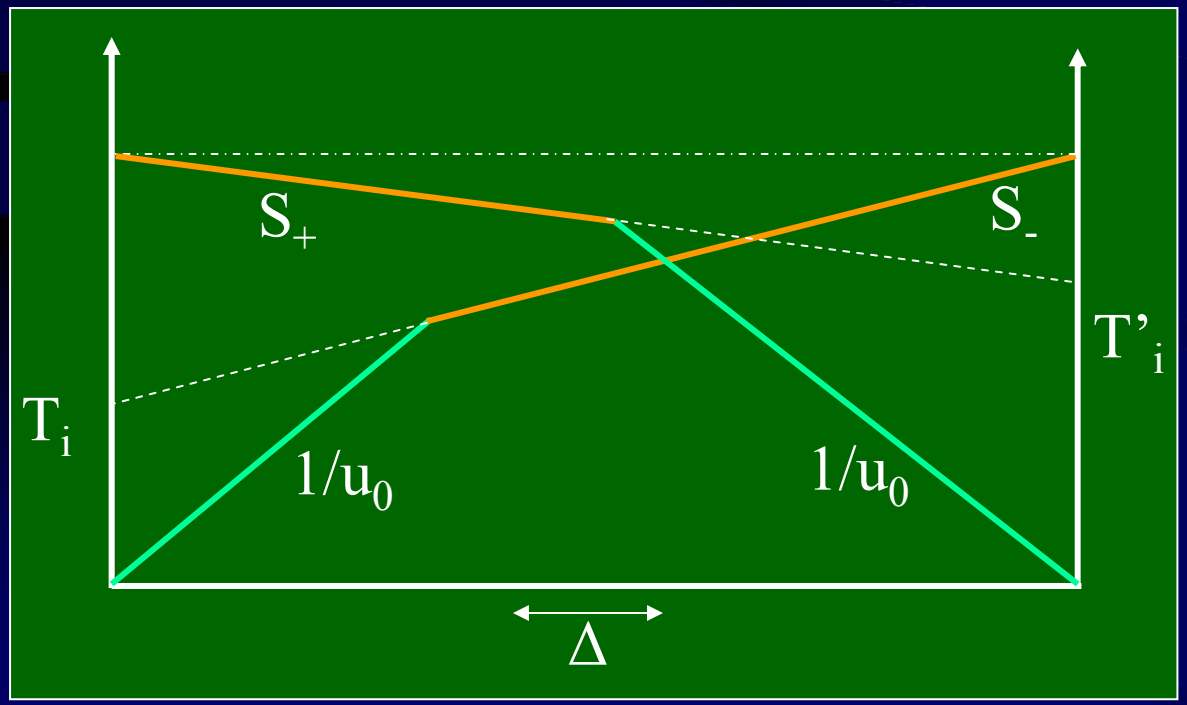
$$S_+ = \frac{\eta\mu(i_c - \theta)}{u_0}$$

Νόμος Snell

$$u_0 = u_1\eta\mu i_c$$

$$S_+ = \frac{\eta\mu(i_c - \theta)}{u_1\eta\mu i_c}$$

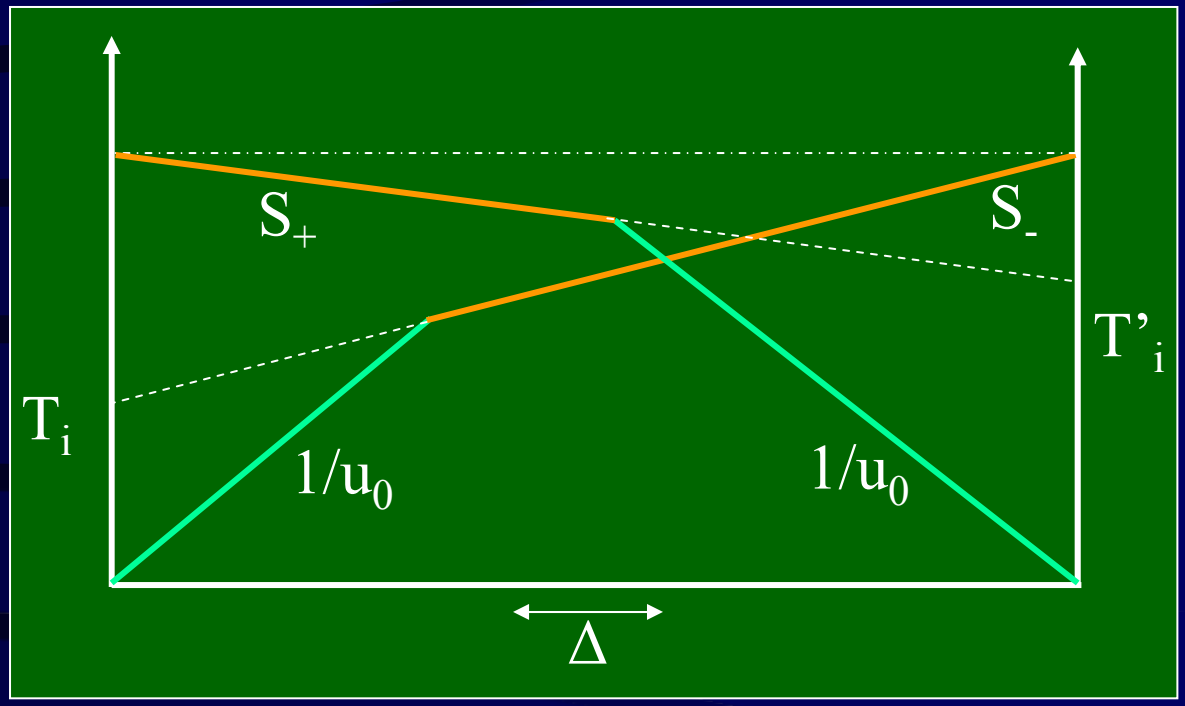



Τακτική επίλυσης του προβλήματος

Διενέργεια κανονικού και αντιστρόφου σεισμικού προφίλ

Κατασκευή καμπύλων χρόνου διαδρομής των δύο προφίλ




Εφαρμογή Ελαχίστων τετραγώνων στα δεδομένα (Δ, t)

Υπολογισμός των κλίσεων των τεσσάρων ευθειών

Υπολογισμός των ποσοτήτων [$S_+$ , $S_-$] της ταχύτητας $u_0$ και των $T_i$

$$S_- = \frac{\eta\mu(i_c + \theta)}{u_1 \eta\mu i_c}$$

$$u_0 = u_1 \eta\mu i_c$$

$$S_+ = \frac{\eta\mu(i_c - \theta)}{u_1 \eta\mu i_c}$$

$$S_+ = \frac{\eta\mu(i_c - \theta)}{u_0}$$

$$S_- = \frac{\eta\mu(i_c + \theta)}{u_0}$$

$$i_c - \theta = \tau o \xi \eta\mu(S_+ u_0)$$

$$i_c + \theta = \tau o \xi \eta\mu(S_- u_0)$$

$$i_c - \theta = \tau o \xi \eta \mu (S_+ u_0)$$

$$i_c + \theta = \tau o \xi \eta \mu (S\_ u_0)$$

(+)

$$i_c = \frac{\tau o \xi \eta \mu (S_+ u_0) + \tau o \xi \eta \mu (S\_ u_0)}{2}$$

$$i_c - \theta = \tau o \xi \eta \mu (S_+ u_0)$$

$$i_c + \theta = \tau o \xi \eta \mu (S\_ u_0)$$

(-)

$$\theta = \frac{\tau o \xi \eta \mu (S\_ u_0) - \tau o \xi \eta \mu (S_+ u_0)}{2}$$

$$S_- = \frac{\eta\mu(i_c + \theta)}{u_1 \eta\mu i_c}$$

$$S_+ = \frac{\eta\mu(i_c - \theta)}{u_1 \eta\mu i_c}$$

$$S_- = \frac{\eta\mu i_c \sigma\upsilon\nu\theta + \sigma\upsilon\nu i_c \eta\mu\theta}{u_1 \eta\mu i_c}$$

$$S_+ = \frac{\eta\mu i_c \sigma\upsilon\nu\theta - \sigma\upsilon\nu i_c \eta\mu\theta}{u_1 \eta\mu i_c}$$

(+)

$$u_1 = \frac{2\sigma\upsilon\nu\theta}{S_- + S_+}$$

# Υπολογισμός παχών με την Ορική Απόσταση $\Delta_c$

Για $\Delta=\Delta_c$ (ορική απόσταση)

$$T_{\text{απευθείας}} = T_{\text{μετωπικών}}$$

$$T = \frac{\Delta_c}{u_0}$$

$$T = \Delta_c \frac{\eta\mu(i_c \pm \theta)}{u_0} + \frac{2d\sigma\upsilon\nu i_c}{u_0}$$

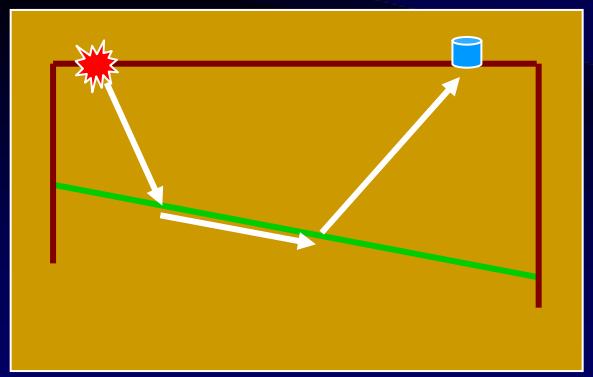
$$\frac{\Delta_c}{u_0} = \Delta_c \frac{\eta\mu(i_c \pm \theta)}{u_0} + \frac{2d\sigma\upsilon\nu i_c}{u_0}$$

$$d = \frac{\Delta_c}{2\sigma\upsilon\nu i_c}\left[1 - \eta\mu(i_c \pm \theta)\right]$$

$$d = \frac{\Delta_c}{2\sigma\upsilon\nu i_c}\left[1 - \eta\mu\left(i_c \pm \theta\right)\right]$$

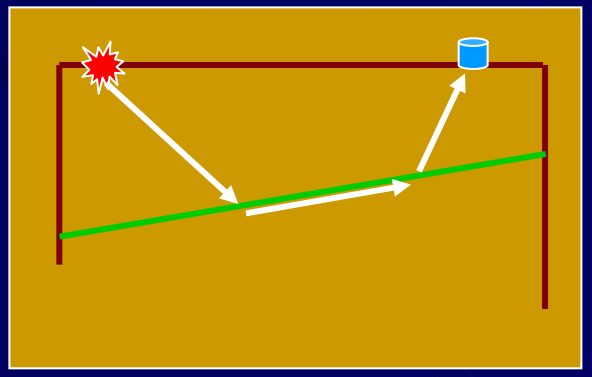
$$z = \frac{d}{\sigma\upsilon\nu\theta}$$

$$z = \frac{\Delta_c\left[1 - \eta\mu\left(i_c \pm \theta\right)\right]}{2\sigma\upsilon\nu\theta\sigma\upsilon\nu i_c}$$



(+)

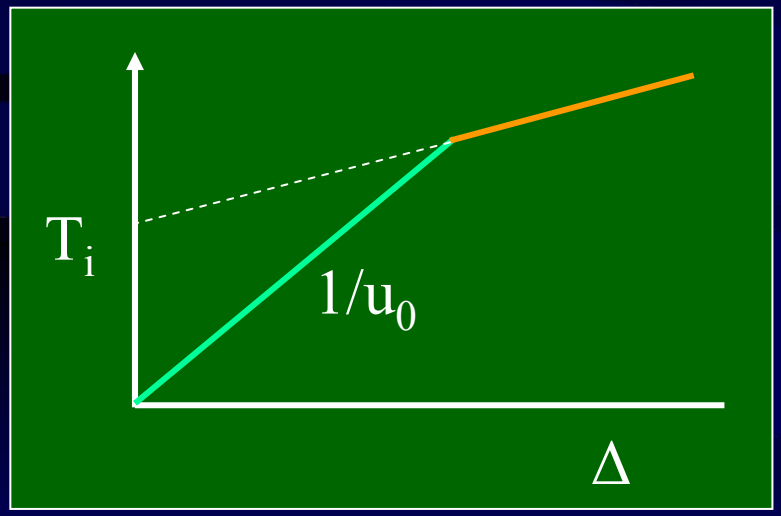
(-)



# Υπολογισμός παχών με τον Χρόνο Συνάντησης $T_i$

$$T = \Delta \frac{\eta\mu(i_c \pm \theta)}{u_0} + \frac{2d\sigma\upsilon\nu i_c}{u_0}$$

$$T_i = \frac{2d\sigma\upsilon\nu i_c}{u_0}$$

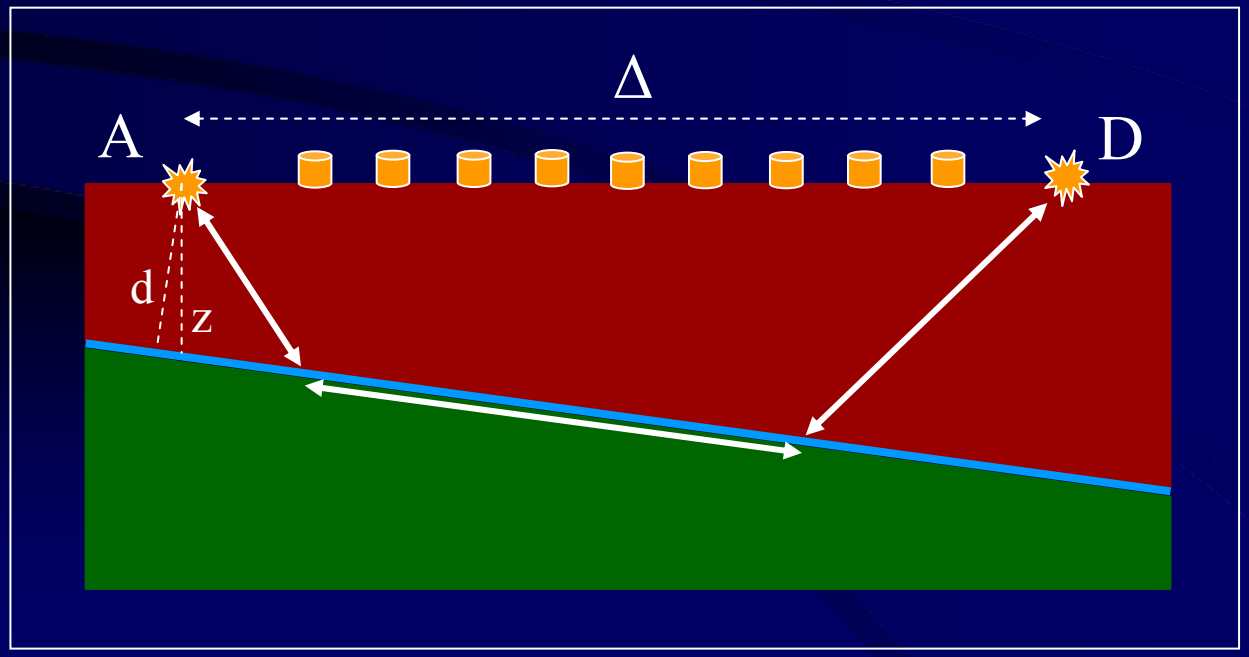



$$d = \frac{T_i u_0}{2\sigma\upsilon\nu i_c}$$

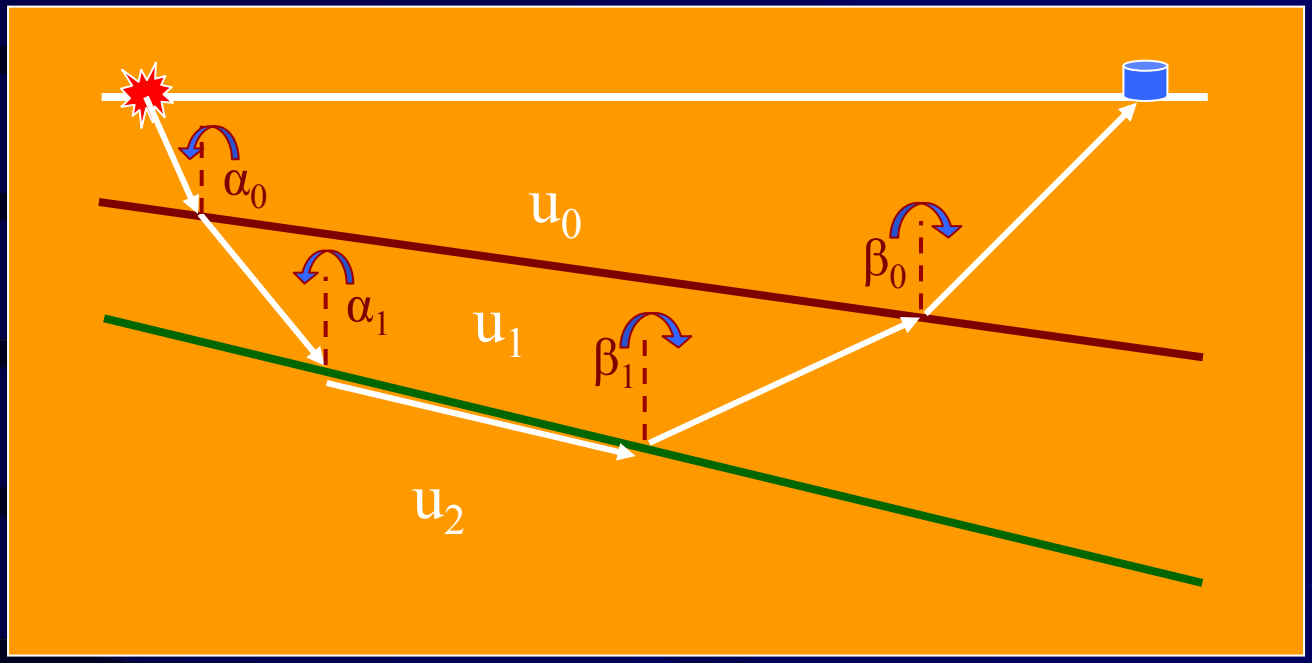
$$d = \frac{T_i u_0}{2\sigma\upsilon\nu i_c}$$

$$z = \frac{d}{\sigma\upsilon\nu\theta}$$

$$z = \frac{u_0 T_i}{2\sigma\upsilon\nu i_c \sigma\upsilon\nu\theta}$$

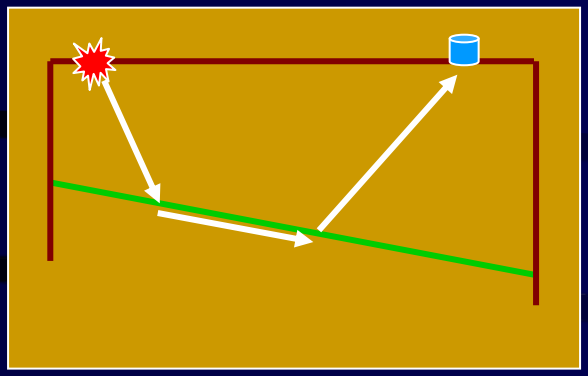


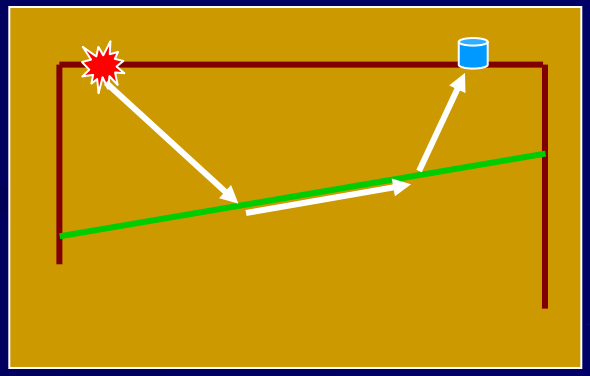
# Δομή πολλών στρωμάτων με κεκλιμένη την κάτω επιφάνεια




$$T_n = \frac{\eta\mu\beta_0}{u_0}\Delta + \sum_{i=0}^{n-1}\frac{z_i\left(\sigma\upsilon\nu\alpha_i + \sigma\upsilon\nu\beta_i\right)}{u_i}$$

$$T_n = \frac{\eta\mu\beta_0}{u_0}\Delta + \sum_{i=0}^{n-1}\frac{z_i\left(\sigma\upsilon\nu\alpha_i + \sigma\upsilon\nu\beta_i\right)}{u_i}$$





$$a_i = i_{in} - \theta_i$$

$$\beta_i = i_{in} + \theta_i$$

$$\eta\mu i_{in} = \frac{u_i}{u_n}$$

Νόμος Snell

$$a_i = i_{in} + \theta_i$$

$$\beta_i = i_{in} - \theta_i$$

Διαδοχικές εφαρμογές της παραπάνω σχέσης υπολογίζουν τα $z_i$ και $\theta_\iota$