

## ΚΥΜΑΤΑ

### ΘΕΜΕΛΙΩΔΗΣ ΕΞΙΣΩΣΗ ΚΥΜΑΤΙΚΗΣ

$$v = \frac{\lambda}{T} = \lambda \cdot f$$

### ΕΞΙΣΩΣΗ ΚΥΜΑΤΟΣ

$$\psi_{\text{πηγή}(x=0)} = A \cdot \eta\mu\omega t = A \cdot \eta\mu \frac{2\pi}{T} t = A \cdot \eta\mu 2\pi f t$$

$$\psi = A \cdot \eta\mu[\omega(t - t_{\text{καθ}})] = A \cdot \eta\mu[\omega(t - \frac{\chi}{v})] = A \cdot \eta\mu[\frac{2\pi}{T}(t - \frac{\chi}{v})] =$$

$$A \cdot \eta\mu[2\pi(\frac{t}{T} - \frac{\chi}{vT})] = A \cdot \eta\mu[2\pi(\frac{t}{T} - \frac{\chi}{\lambda})] = A \cdot \eta\mu[2\pi(f \cdot t - \frac{1}{\lambda} \cdot \chi)]$$

### ΣΥΜΒΟΛΗ ΚΥΜΑΤΩΝ

$$\psi = \psi_1 + \psi_2 = A \eta\mu 2\pi(\frac{t}{T} - \frac{r_1}{\lambda}) + A \eta\mu 2\pi(\frac{t}{T} - \frac{r_2}{\lambda}) =$$

$$2A \sigma\upsilon\nu 2\pi \frac{r_1 - r_2}{2\lambda} \eta\mu 2\pi(\frac{t}{T} - \frac{r_1 + r_2}{2\lambda}) =$$

$$A' \cdot \eta\mu 2\pi(\frac{t}{T} - \frac{r_1 + r_2}{2\lambda})$$

**ενίσχυση** ( $A' = 2A$ ):  $r_1 - r_2 = N \cdot \lambda$ ,  $N = 0, \pm 1, \pm 2, \dots$

**απόσβεση** ( $A' = 0$ ):  $r_1 - r_2 = (2N + 1) \cdot \frac{\lambda}{2}$ ,  $N = 0, \pm 1, \pm 2, \dots$

### ΣΤΑΣΙΜΟ ΚΥΜΑ

$$\psi = \psi_1 + \psi_2 = A \eta\mu 2\pi(\frac{t}{T} - \frac{\chi}{\lambda}) + A \eta\mu(\frac{t}{T} + \frac{\chi}{\lambda}) =$$

$$2A \sigma\upsilon\nu 2\pi \frac{\chi}{\lambda} \eta\mu 2\pi \frac{t}{T} =$$

$$A' \cdot \eta\mu 2\pi \frac{t}{T}$$

**κοιλίες** ( $A' = 2A$ ):  $\chi = \kappa \cdot \frac{\lambda}{2}$ ,  $\kappa = 0, 1, 2, \dots$

**δεσμοί** ( $A' = 0$ ):  $\chi = (2\kappa + 1) \cdot \frac{\lambda}{4}$ ,  $\kappa = 0, 1, 2, \dots$

### ΗΛΕΚΤΡΟΜΑΓΝΗΤΙΚΟ ΚΥΜΑ

$$E = E_{\text{max}} \eta\mu 2\pi(\frac{t}{T} - \frac{\chi}{\lambda}) \quad B = B_{\text{max}} \eta\mu 2\pi(\frac{t}{T} - \frac{\chi}{\lambda}) \quad c = \frac{E}{B}$$

δείκτης διάθλασης:  $n = \frac{c}{v} = \frac{\lambda_0}{\lambda} > 1$

νόμος Snell:  $n_a \cdot \eta\mu\theta_a = n_b \cdot \eta\mu\theta_b$

κρίσιμη γωνία:  $n_a \cdot \eta\mu\theta_{\text{κρ}} = n_b \cdot \eta\mu \frac{\pi}{2} \rightarrow \eta\mu\theta_{\text{κρ}} = \frac{n_b}{n_a}$

για  $n_b = 1$  (αέρας):  $\eta\mu\theta_{\text{κρ}} = \frac{1}{n_a}$