LECTURE 10

Fourier transform of $f(x)$

defined on $-\infty < x < +\infty$

$$g(k) = \frac{1}{2\pi} \int_{-\infty}^{\infty} f(x)\, e^{-ikx}\, dx \qquad k = \frac{2\pi}{\lambda}$$

Inverse Fourier transform

$$f(x) = \int_{-\infty}^{\infty} g(k)\, e^{ikx}\, dk$$

Plane wave $\quad e^{i(kx-\omega t)}$

Phase "velocity"

$$v_p = \left|\frac{\omega}{k}\right|$$

to R if x, t opposite signs
" L " " same "

Ordinary wave eqn. $\quad \dfrac{\partial^2 \phi}{\partial x^2} = \dfrac{1}{c^2}\dfrac{\partial^2 \phi}{\partial t^2}$

- plane wave is separable solution if

$$\omega(k) = ck$$

- phase velocity

$$v_p = c$$ independant of k

nondispersive