A solution to the wave equation is:

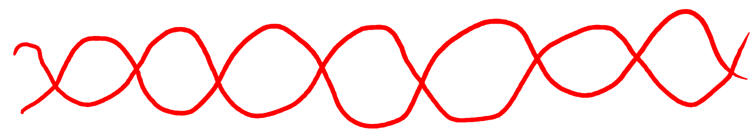
$f(z,t) = \mathrm{Re}[A\, e^{i(kz - \omega t + \delta)}]$

If δ is small (and >0), is this wave "delayed" or "advanced" compared to $e^{i(kz - \omega t)}$?

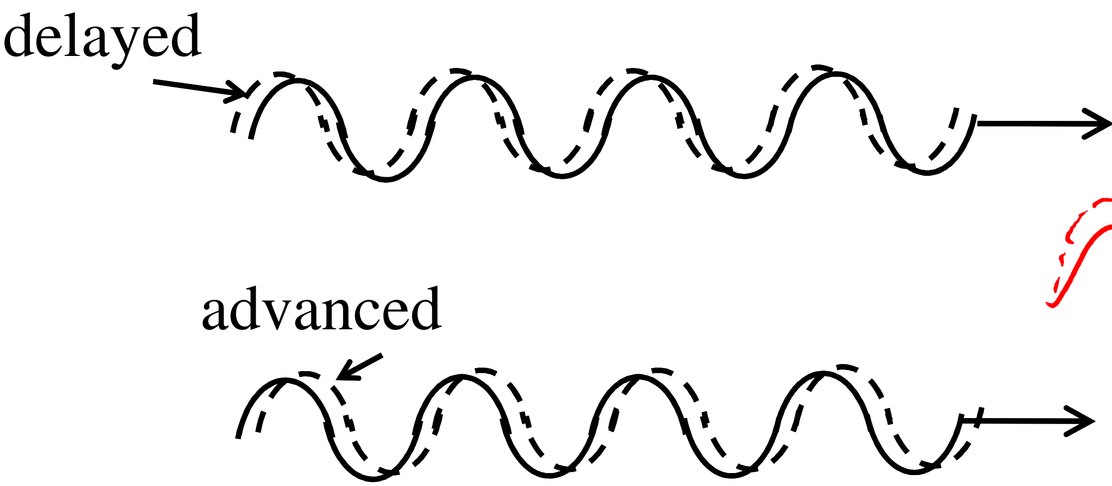
A) delayed

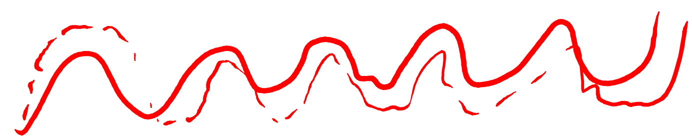
B) advanced

C) neither, depends on values of z and t.



destructive interference





constructive

in

Write down complex exponential representations of the three fields involved in a *single* interface situation (coming from air, incident on glass).

Take the real part and look at the incident and reflected waves. Is it possible for the reflected wave to interfere destructively with the incident wave?

You may or may not consider it useful to use the addition/subtraction rules for sine and/or cosine.

A. Yes 23
B. No 22

$$\cos(A \pm B) = \cos(A)\cos(B) \mp \sin(A)\sin(B)$$

$$\sin(A \pm B) = \sin(A)\cos(B) \pm \cos(A)\sin(B)$$

Suppose we have a two interface situation, incident light of wavelength λ, and a center slab of index n_2. There is air on either end of the slab. Which of the following center slab thicknesses will lead to destructive interference?

A. $\frac{3\lambda}{4}$

B. $\frac{3\lambda}{4n_2}$

C. $\frac{3\lambda}{2n_2}$

D. $\frac{3\lambda}{2}$

For light at normal incidence, we found:

$$R = \frac{(n_1 - n_2)^2}{(n_1 + n_2)^2}, \quad T = \frac{4n_1 n_2}{(n_1 + n_2)^2}$$

What gives a large reflection of light at normal incidence?

A) When $v_1 >> v_2$
B) When $v_2 >> v_1$
C) When v is very *different* in the two media
D) When v is nearly the *same* in the two media
E) More than one of these