

A wave running across the oceans of α Cen D has height given by

$$y(x,t) = (1.1 \text{ m}) \cos(0.0722x - 0.1400t + 2.890)$$

where x is measured in meters
 t " " " seconds

Thus $k = 0.0722 \frac{\text{rad}}{\text{m}}$ wave number

$$\omega = 0.1400 \frac{\text{rad}}{\text{s}}$$
 ang frequency

We can also compute

$$\lambda = \frac{2\pi}{k} = 87.0 \text{ m}$$
 wavelength

$$P = \frac{2\pi}{\omega} = 44.9 \text{ s}$$
 period

$$f = \frac{\omega}{2\pi} = 0.0223 \frac{\text{cycle}}{\text{s}}$$
 frequency

$$v = \frac{\omega}{k} = 1.94 \frac{\text{m}}{\text{s}}$$
 speed of propagation

$$\text{max } v_y = (1.1 \text{ m}) \left(0.14 \frac{\text{rad}}{\text{s}}\right) = 0.154 \frac{\text{m}}{\text{s}}$$
 vertical speed

$$\text{max } a_y = (1.1 \text{ m}) \left(0.14 \frac{\text{rad}}{\text{s}}\right)^2 = 0.0216 \frac{\text{m}}{\text{s}^2}$$
 vertical acceleration