9/8/13
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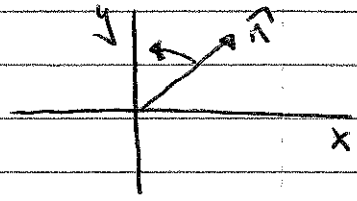
Solution to Problem 9.8

* Equal amplitude but with $\delta_V = 0$ & $\delta_H = 90°$

→ $\vec{f}(z,t) = A\,\mathrm{Re}\left[e^{i(kz-\omega t)}\vec{x} + i e^{i(kz-\omega t)}\vec{y}\right] = A\left[\cos(kz-\omega t)\,\vec{x} - \sin(kz-\omega t)\,\vec{y}\right]$

(a) * the direction of $\vec{f}(z,t)$ is $\hat{n}(z,t) = \cos(kz-\omega t)\,\hat{x} + \sin(kz-\omega t)\,\hat{y}$

* at fixed z this moves (counter-clockwise) as seen from $+z$

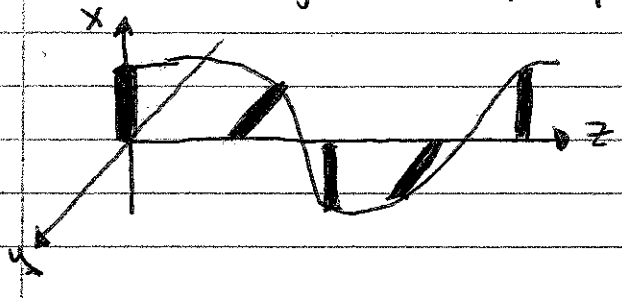


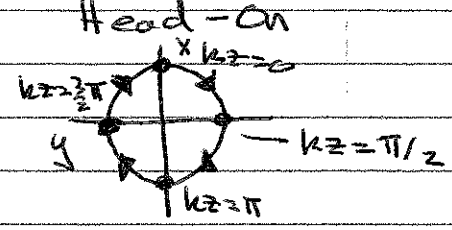
* the other wave has $\delta_V = 0$ & $\delta_H = -90°$

→ $\vec{f}(z,t) = A\left[\cos(kz-\omega t)\,\hat{x} + \sin(kz-\omega t)\,\vec{y}\right]$

(b) * at $t=0$ → $\vec{f}(z,0) = A\left[\cos(kz)\,\vec{x} - \sin(kz)\,\vec{y}\right]$

* I'm not great at perspective sketches but I'll try





(c) * if you hold the string at $z=0$

→ move the end around counter-clockwise in a circle of radius A