

PPP

$$5-12 (a) v_f = \frac{\omega}{k} = 2\pi\lambda\omega = \lambda\nu$$

$$v_L = v_g = \frac{d\omega}{dk}$$

$$HL: \frac{dv_f}{d\lambda} = \frac{d}{d\lambda}(\lambda\nu) = \nu + \lambda \frac{d\nu}{d\lambda}$$

$$HL = v_f - \lambda \frac{dv_f}{d\lambda} = v_f - \lambda\nu - \lambda^2 \frac{d\nu}{d\lambda} = -\lambda^2 \frac{d\nu}{d\lambda}$$

Nu maste vi vija at $\frac{d\omega}{dk} = -\lambda^2 \frac{d\nu}{d\lambda}$

$$v_L = \frac{d\omega}{dk} = 2\pi \frac{d\omega}{dk} = 2\pi \frac{d\nu}{d\lambda} \frac{d\lambda}{dk}$$

$$\left\{ \lambda = \frac{2\pi}{k} \Rightarrow \frac{d\lambda}{dk} = -\frac{2\pi}{k^2} \right\}$$

$$= -\frac{(2\pi)^2}{k^2} \frac{d\nu}{d\lambda} = -\lambda^2 \frac{d\nu}{d\lambda}$$

$\therefore v_L = HL$ v.s.H.

b) $v_f = A + B\lambda$ $\frac{dv_f}{d\lambda} = B$

$$v_g = A + B\lambda - \lambda \cdot B = \underline{A} \quad \text{konstant linelighet}$$

