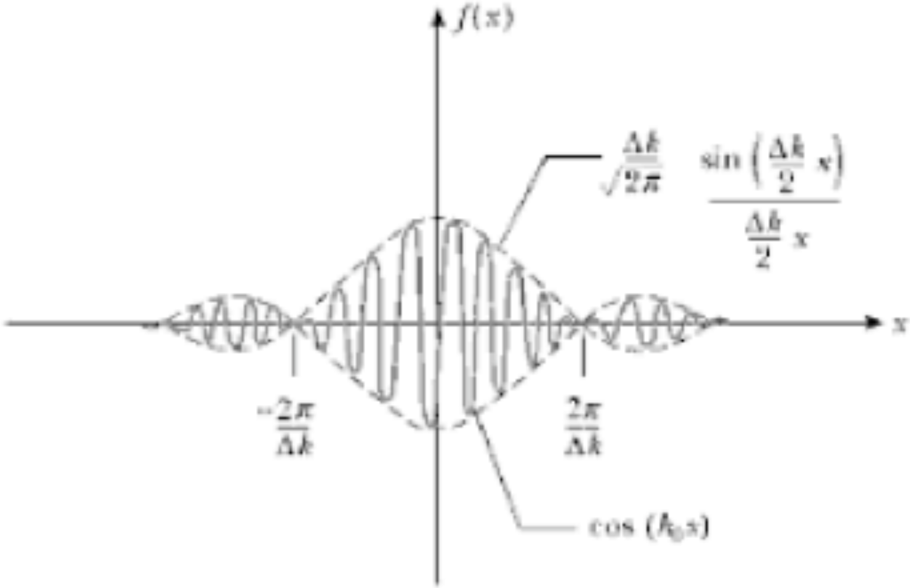
Solution

$$f(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{+\infty} a(k) e^{ikx}\, dk = \frac{1}{\sqrt{2\pi}} \int_{k_0-(\Delta k/2)}^{k_0+(\Delta k/2)} e^{ikx}\, dk = \frac{1}{\sqrt{2\pi}} \frac{e^{ik_0x}}{x} 2\sin(\Delta k \cdot x/2)$$

$$= \frac{\Delta k}{\sqrt{2\pi}} \frac{\sin(\Delta k \cdot x/2)}{(\Delta k \cdot x/2)} e^{ik_0x}$$



The real part of the wave packet formed by the uniform amplitude distribution shown in Figure