Free Particle

\[ \psi = e^{-\left(\frac{x}{a}\right)^2} \]

\( \psi = \) Gaussian function

Let \( a = 1 \) (~uncertainty in \( x \))

\[ c_k \] vs. \( k \)

Uncertainties in \( x \) & \( k \) (really \( p \)) are inversely related

\[ \psi = \text{linear combination of momentum eigenfunctions} \]

\[ \psi = \sum_{k=-\infty}^{\infty} c_k e^{i k x} \]

\[ c_k = \int_{-\infty}^{\infty} \psi (e^{i k x}) \, dx \]