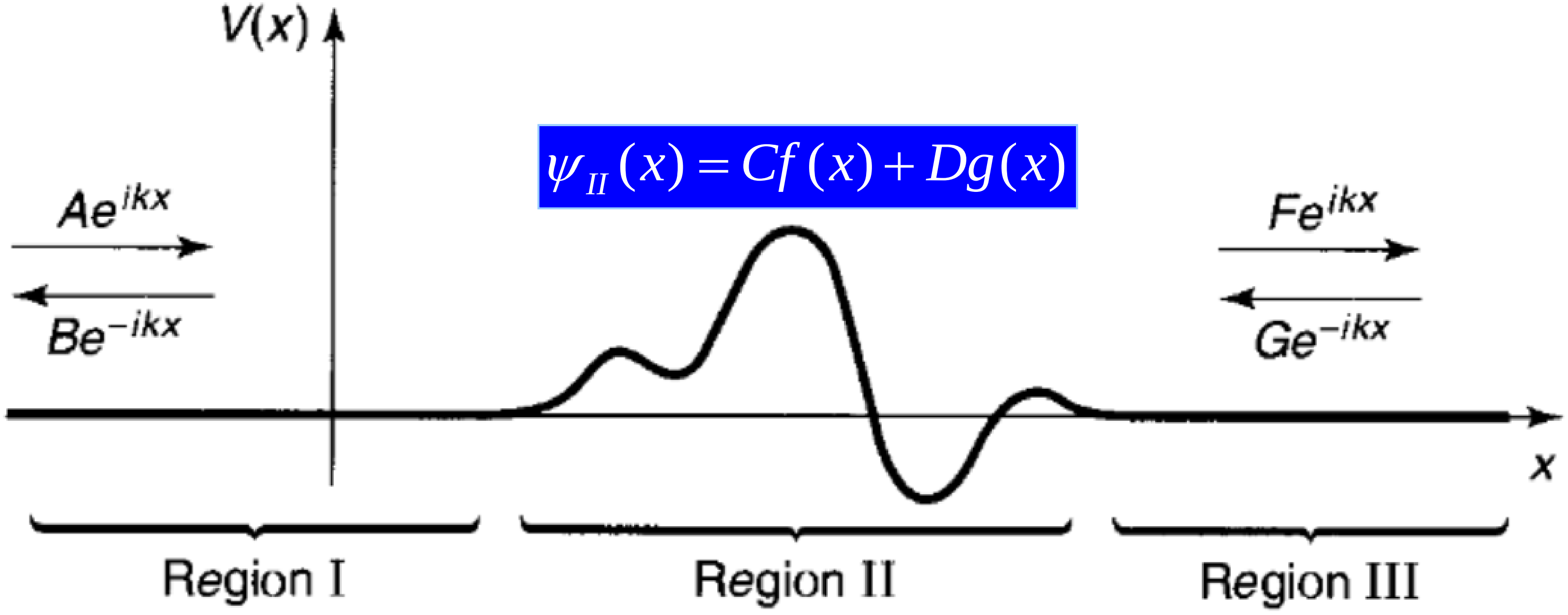
# Scattering from a localized potential, is given in figure.




The outgoing amplitudes (B, F) is expressed in terms of incoming amplitudes (A, G) via the use of scattering matrix

$$\begin{pmatrix} B \\ F \end{pmatrix} = \begin{pmatrix} S_{11} & S_{12} \\ S_{21} & S_{22} \end{pmatrix} \begin{pmatrix} A \\ G \end{pmatrix}$$

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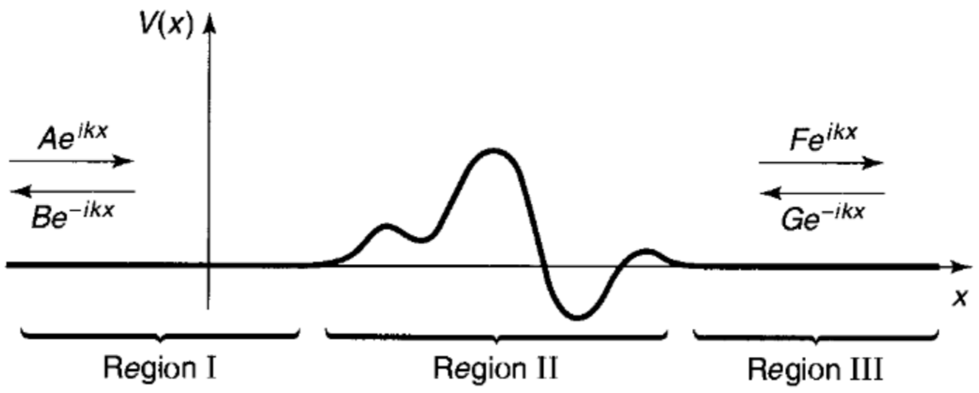



For a typical case of scattering from left, G=0. Therefore the reflection and transmission coefficients are

$$R = \frac{|B|^2}{|A|^2} = |S_{11}|^2 \text{ and } T = \frac{|F|^2}{|A|^2} = |S_{21}|^2$$

For a typical case of scattering from right, A=0. Therefore the reflection and transmission coefficients are

$$R = \frac{|F|^2}{|G|^2} = |S_{22}|^2 \text{ and } T = \frac{|B|^2}{|G|^2} = |S_{12}|^2$$

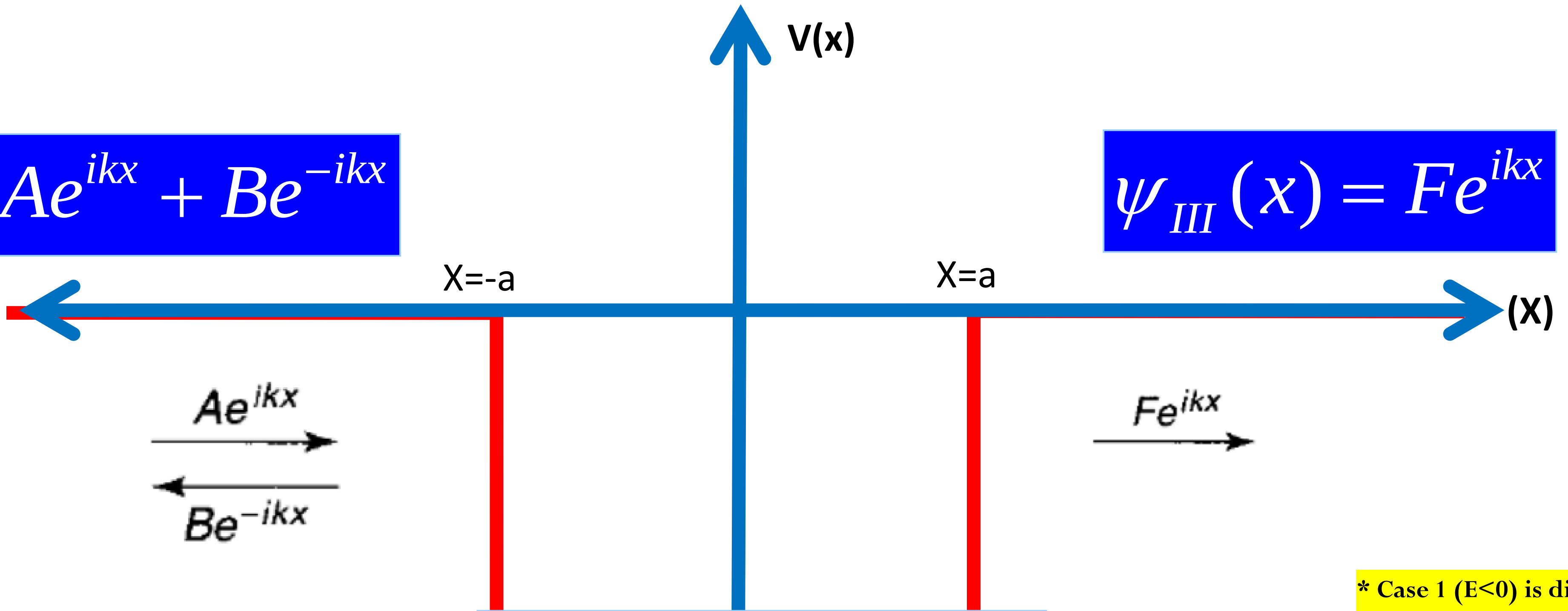
Consider a particle with E>0 incident from left to the finite square well.
Find the transmission coefficient for this problem.

## Case 2* : E>0

$$V(x) = \begin{cases} -V_0 & \text{for } -a < x < a \\ 0 & \text{Otherwise} \end{cases}$$

$$\psi_I(x) = Ae^{ikx} + Be^{-ikx}$$

$$\psi_{III}(x) = Fe^{ikx}$$




$$\psi_{II}(x) = C\sin(ux) + D\cos(ux)$$

* Case 1 (E<0) is discussed class.