Connection formulae in the WKB approach

By: Alexandra Olaya-Castro, 03 Nov 2015

Right-hand barrier - with classical turning point at $x = a$:

$$\frac{2}{\sqrt{p(x)}} \cos\left(\int_x^a p(x')dx'/\hbar - \frac{\pi}{4}\right) \quad \leftarrow \quad \frac{1}{\sqrt{q(x)}} \exp\left[-\int_a^x q(x')dx'/\hbar\right]$$

$$-\frac{1}{\sqrt{p(x)}} \sin\left(\int_x^a p(x')dx'/\hbar - \frac{\pi}{4}\right) \quad \rightarrow \quad \frac{1}{\sqrt{q(x)}} \exp\left[+\int_a^x q(x')dx'/\hbar\right]$$

Left-hand barrier - with classical turning point at $x = a$:

$$\frac{1}{\sqrt{q(x)}} \exp\left[-\int_x^a q(x')dx'/\hbar\right] \quad \rightarrow \quad \frac{2}{\sqrt{p(x)}} \cos\left(\int_a^x p(x')dx'/\hbar - \frac{\pi}{4}\right)$$

$$\frac{1}{\sqrt{q(x)}} \exp\left[+\int_x^a q(x')dx'/\hbar\right] \quad \leftarrow \quad -\frac{1}{\sqrt{p(x)}} \sin\left(\int_a^x p(x')dx'/\hbar - \frac{\pi}{4}\right)$$