Homework 7a

Solve the Lippmann-Schwinger equation

$$|\psi\rangle = |p_{in}\rangle + \hat{G}_0(E)\hat{V}|\psi\rangle$$

for the symmetric double-delta potential

$$\hat{V} = \lambda\left[\delta(x+a) + \delta(x-a)\right]$$

and find the probability of transmition and reflection as function of energy.

OPTIONAL:

Find the s-matrix $S_{n_f n_i}$

$$\langle n_f p|\,\hat{S}\,|n_i \dot{p}\rangle \equiv \delta(p-\dot{p})\, S_{n_i n_f}$$

where $n_i, n_f = \pm 1$ is the direction of the initial and final wave $|np\rangle = \frac{1}{\sqrt{2\pi}} e^{inpx}$.