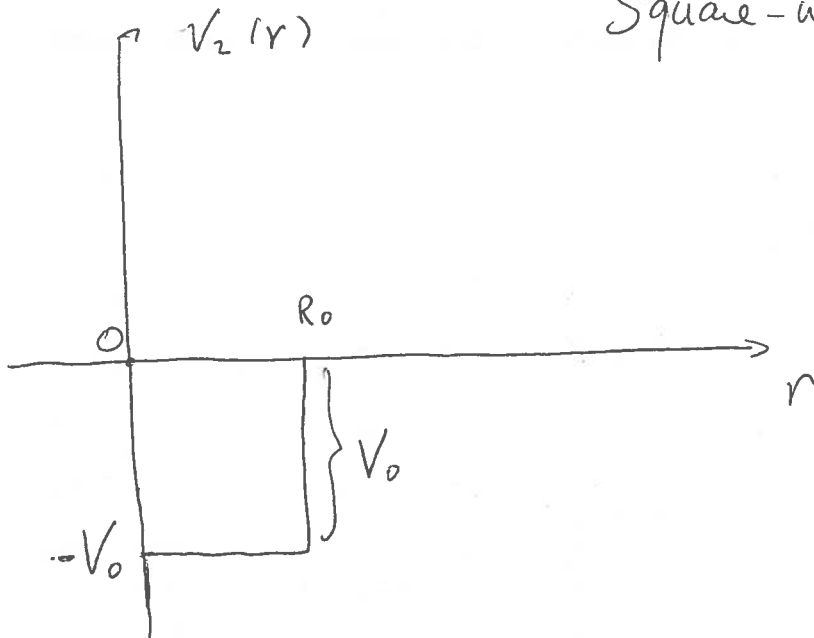


Supplementary stuff:

Prob. 1

Square-well potential



We are interested in the limit $kR_0 \ll 1$

$$B = V_0 R_0^2 \quad (k = m = 1)$$



Bohn Parameter

$B \ll 1$, Weak scattering; $B \gg 1$, Strong scattering.

Asymptotics:

$$j_l(p) = p^l \left(-\frac{1}{p} \frac{\partial}{\partial p}\right)^l (j_0(p)), \quad j_0 = \frac{\sin p}{p}$$

$$n_l(p) = p^l \left(-\frac{1}{p} \frac{\partial}{\partial p}\right)^l (n_0(p)), \quad n_0 = -\frac{\cos p}{p}$$

One can prove:

$$* j_l(p) \xrightarrow{p \rightarrow 0} \frac{p^l}{(2l+1)!!}, \quad n_l(p) \xrightarrow{p \rightarrow 0} -\frac{(2l-1)!!}{p^{l+1}}$$

$$* j_l(p) \xrightarrow{p \rightarrow \infty} \frac{\sin(p - \frac{l\pi}{2})}{p}, \quad n_l(p) \rightarrow -\frac{1}{p} \cos(p - \frac{l\pi}{2})$$