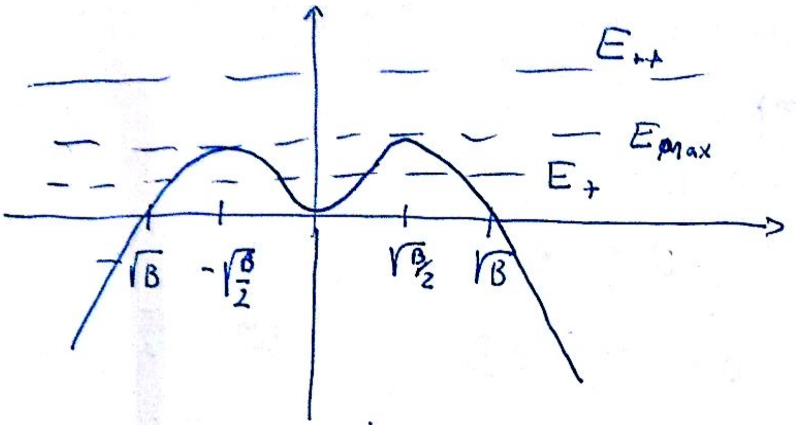
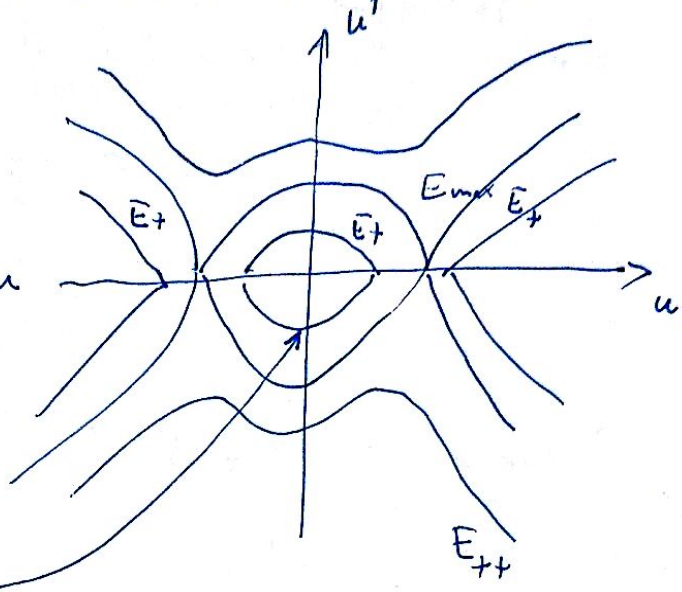
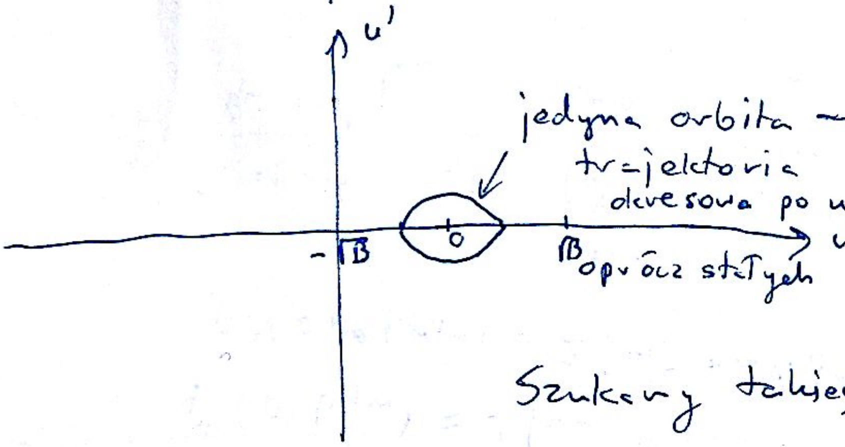
$u'^2 = E - V(u)$ $\qquad$ $u' = \pm\sqrt{E - V(u)}$ ← 'odl.' E od V $\pm$

$V(u) = u^2(B - u^2)$ $\qquad$ $V'(u) = 2u(B - 2u^2)$




Zatem dla

$$E \in (0, E_{max}) = \left(0, \frac{B^2}{4}\right)$$

mamy rozwiązania okresowe.

Szukamy takiego, że $u(0) = u(\pi) = 0$

$$\int_0^{\pi} u(x)^2\,dx = \frac{\pi}{2}$$

$$u'^2 = E - u^2(B - u^2)$$

$$\frac{u'}{\sqrt{E - u^2(B-u^2)}} = 1$$

$$\int_0^t \frac{u'(x)}{\sqrt{E - u(x)^2(B - u(x)^2)}}\,dx = t$$

$z = u(x)$ podstawienie

Dwa równania
dwie niewiadome
E i B gdzie
$u = u_{E,B}$ rozwiązanie

$$\begin{cases} \displaystyle\int_0^{\pi} \frac{1}{\sqrt{E - z^2(B - z^2)}}\,dz = \pi \\ \displaystyle\int_0^{\pi} u(x)^2\,dx = \frac{\pi}{2} \quad \text{gdzie } u \text{ spełnia} \end{cases}$$

$$u'(x)^2 = E - u(x)^2(B - u(x)^2)$$