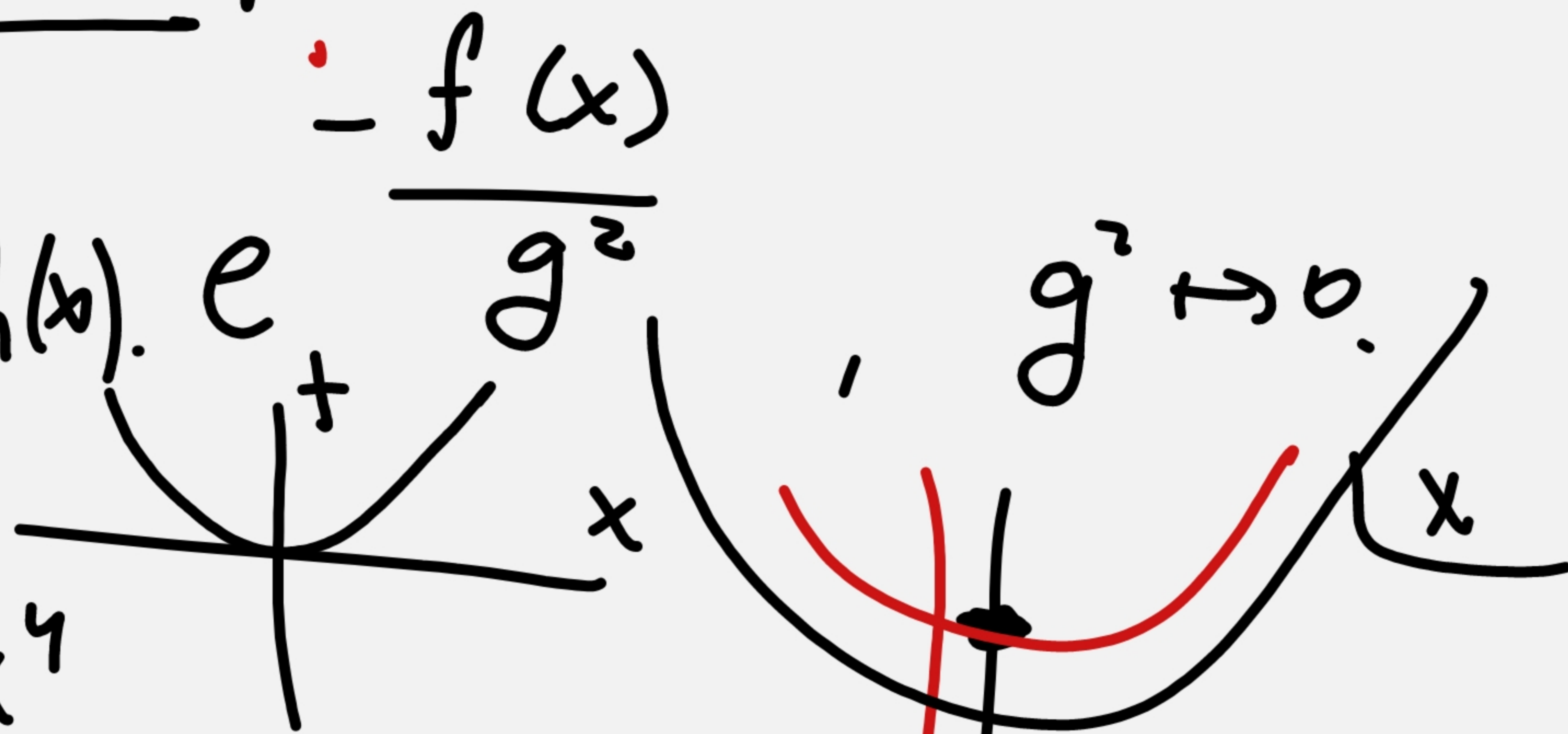


# Лекция 4.

$$I = \int_{-\infty}^{+\infty} h(x) \cdot e^{-\frac{f(x)}{g^2}}$$



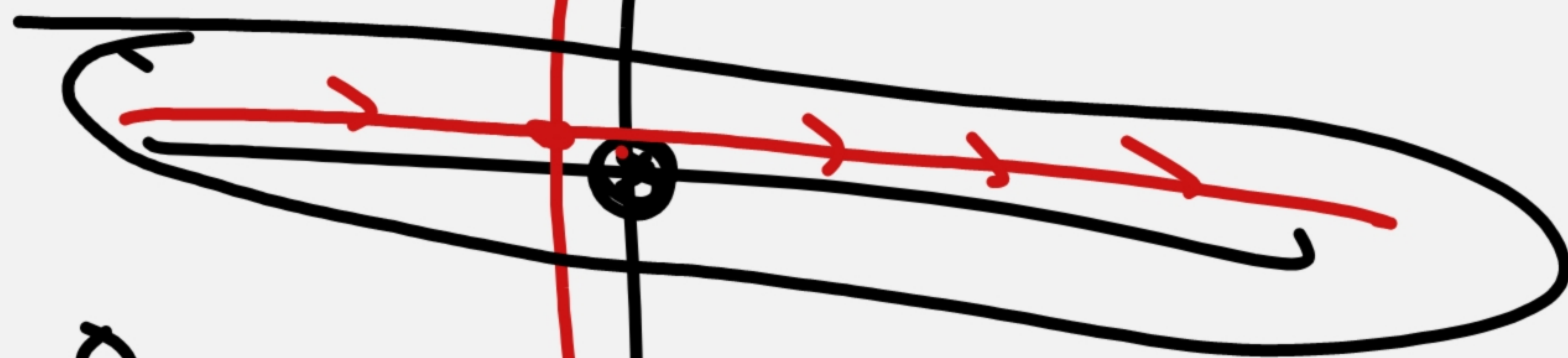
1)  $f(x) = \frac{x^2}{2} + \frac{x^4}{4}$

a)  $f'(x_0) = x_0(x_0^2 + 1) = 0$

$x_0 = 0, (x_0', x_0'') \neq \pm i$

b)  $\text{Im} f = \text{const}$

в) конт. над. часть



конт. Лекция 4

$$I = g \underbrace{e^{\frac{-f(x_0)}{g^2}}}_1 \left( I_0 + g^2 I_2 + \dots \right)$$

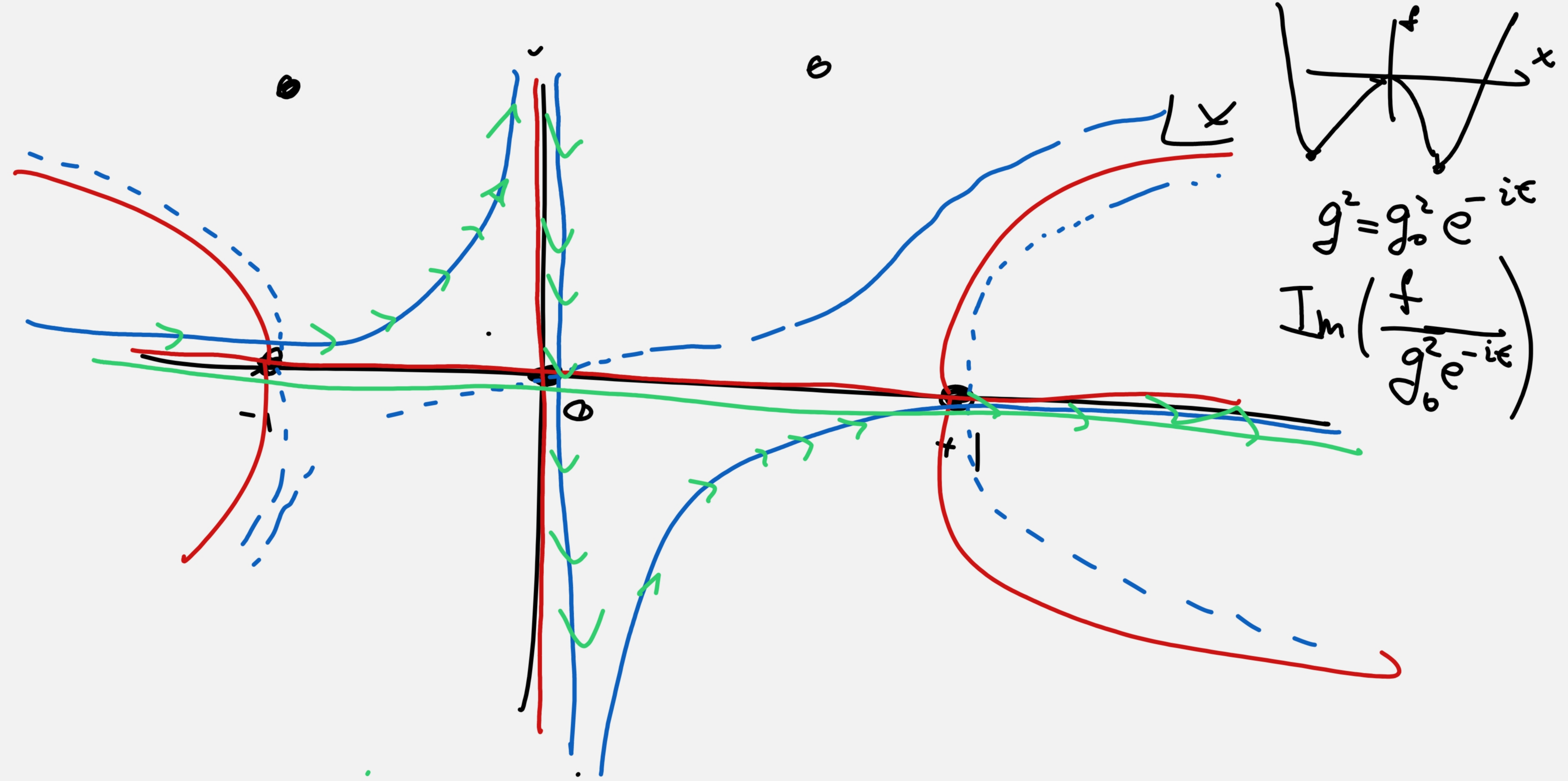
Пример 2

$$f(x) = -\frac{x^2}{2} + \frac{x^4}{4}$$

a)  $f'(x_0) = x(-1 + x^2) \Rightarrow x_0 = 0, \pm 1$

b)  $I_n f = I_n f(x_0)$

$$I \approx g e^{\frac{-f(x_0)}{g^2}} \left( I_0 + g^2 I_2 + \dots \right) = g e^{\frac{-f(x_0)}{g^2}} \left( I_0 + g^2 I_2 + \dots \right) + g e^{\frac{-f(x_0)}{g^2}} \left( \dots \right)$$



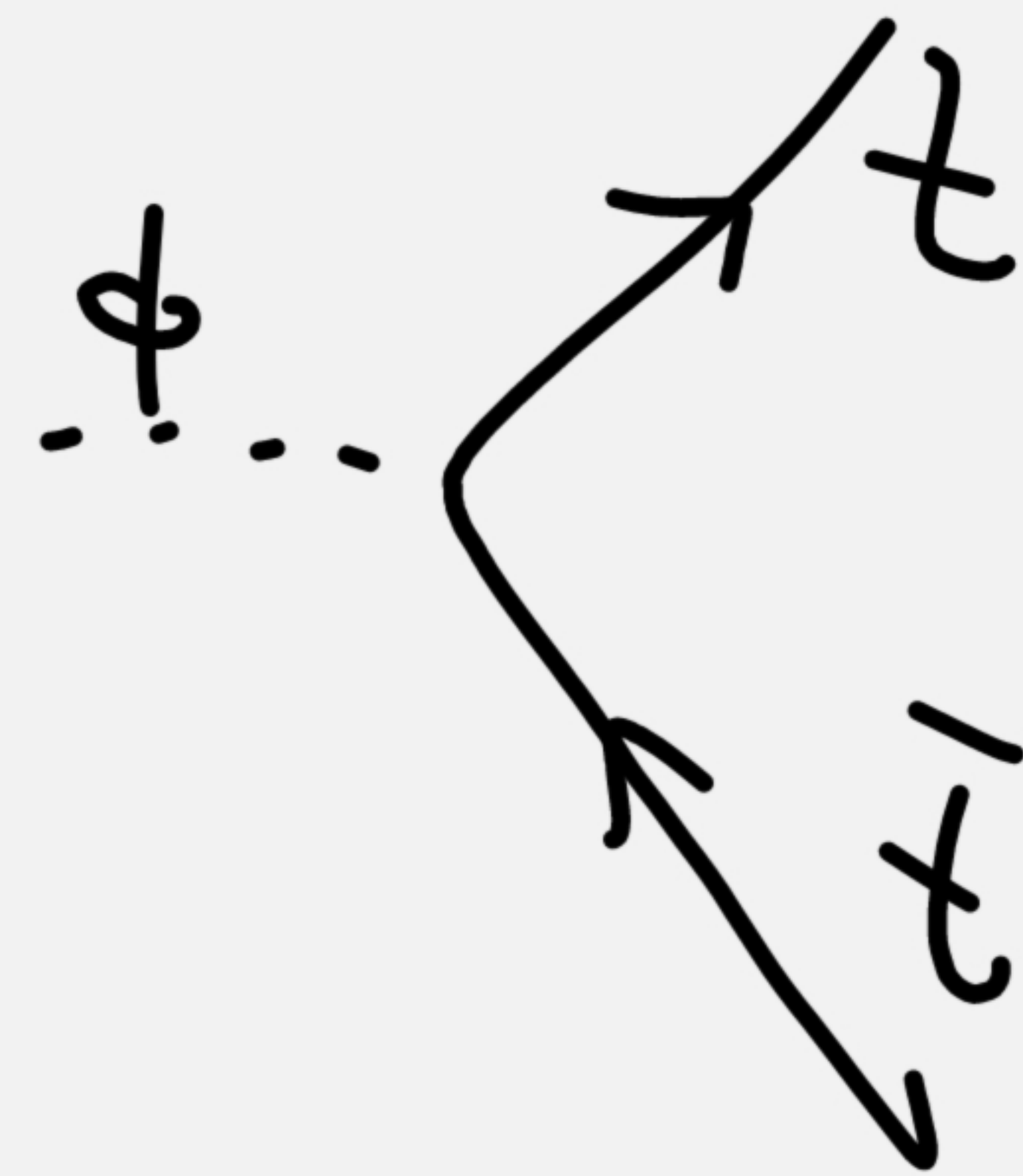
И мет. Вомба



$$V = \frac{\lambda}{4} \left( \frac{H^2 + H^2 - v^2}{\phi^2/2} \right)^2$$

$$V = \frac{\lambda}{4} (\phi^2 - v^2)^2$$

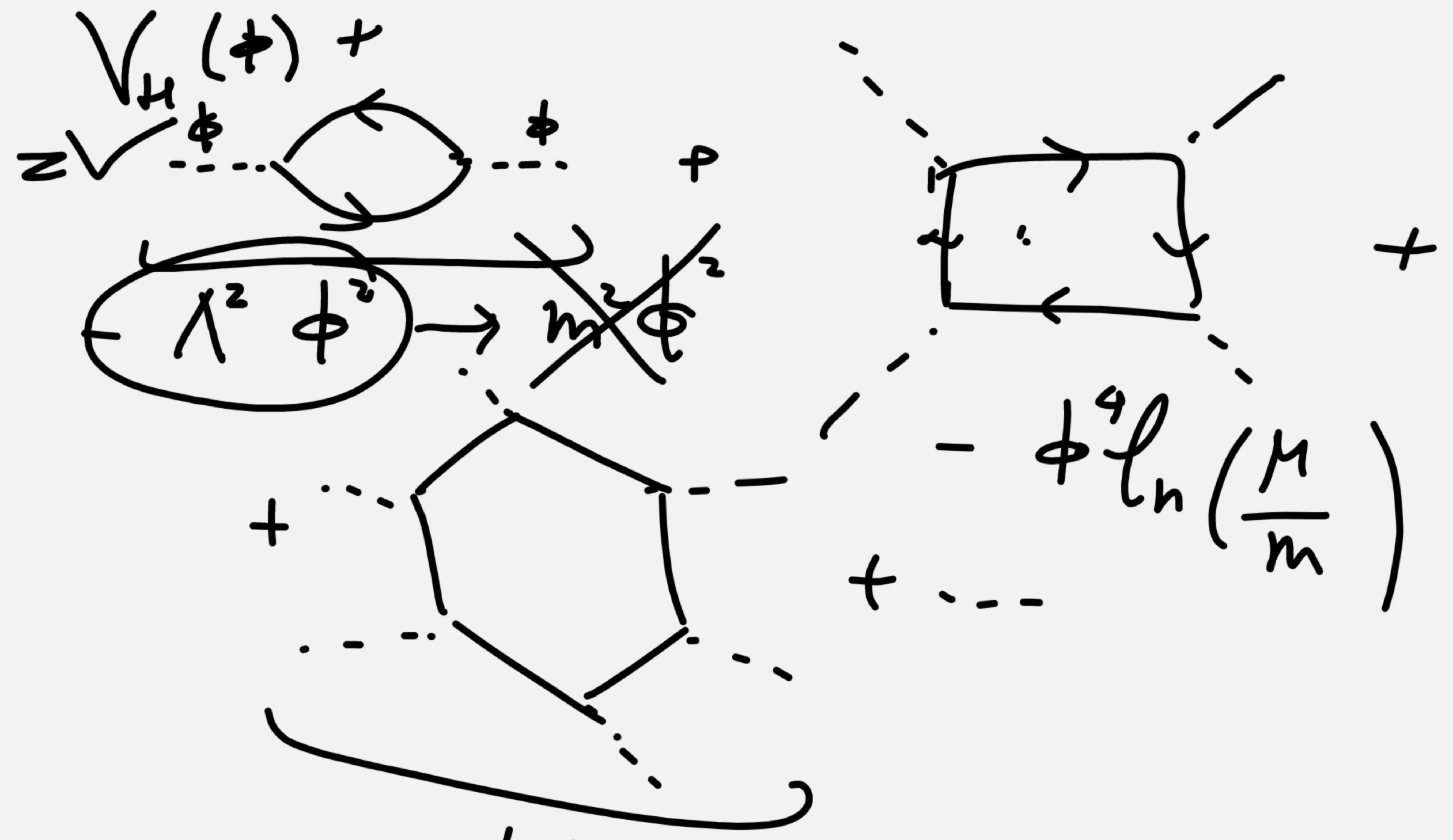
$$\mathcal{L} = \frac{1}{\sqrt{2}} \phi \dot{\phi} \dot{\phi}$$



$$= \int dt dt e^{iS} = \exp\left(\sum \text{quadratic terms}\right)$$

$$e^{-iVt} \frac{V(\phi)}{c\hbar} \stackrel{(1-loop)}{=} e^{iS_{eff}}$$

$V_{\text{eff}}^{(1\text{-loop})}$



$$= V_H(\phi) - \frac{\phi^4}{\lambda^2} \ln\left(\frac{\phi}{m}\right) = \frac{1}{4} \left(\phi^2 - \frac{m^2}{\lambda}\right)^2 - \frac{1}{64} \phi^4 \ln\left(\frac{\phi}{m}\right)$$