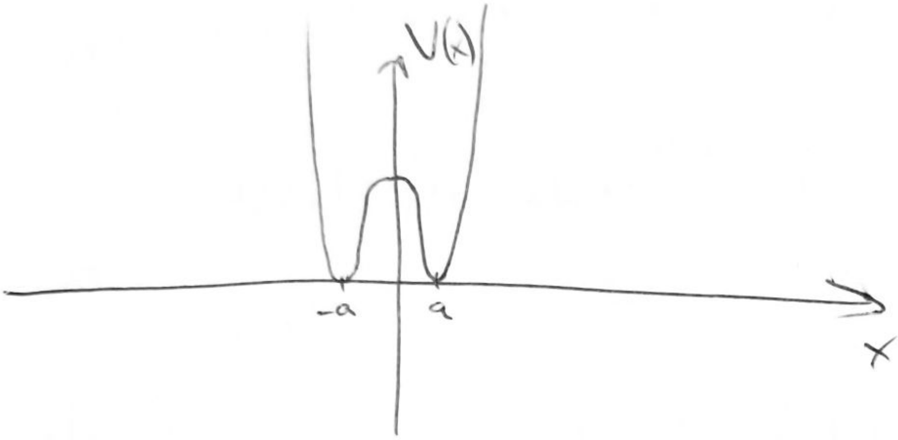
N2

$$V(x) = \frac{(x^4 - a^4)^2}{32a^6} \qquad \hbar = \omega = m = 1$$

$$V' = 2\,\frac{x^4 - a^4}{32a^4}\,(4x^3)$$

$$V''\big|_{x=\pm a} = 8\cdot 4 \cdot \frac{x^6}{32a^6}\Big|_{x=\pm a} = \omega^2 = 1$$



$$\dot{x}_{c_1}^2 = \frac{2}{32a^6}(x_{c_1}^4 - a^4)^2 \Rightarrow \dot{x}_{c_1} = \frac{1}{4a^3}(x_{c_1}^4 - a^4)$$

$$\tau - \tau_0 = \int \frac{4a^3\,dx}{x^4 - a^4} = -2\arctan\frac{x}{a} + \ln\left|\frac{a-x}{a+x}\right|$$

$$S_{c_1} = \int_{-\beta/2}^{\beta/2} \dot{x}_{c_1}^2\,d\tau = \int_{-a}^{a} \dot{x}_{c_1}\,dx_{c_1} = \int_{-a}^{a} \sqrt{2V(x_{c_1})}\,dx_{c_1} =$$

$$= \sqrt{\frac{1}{16a^6}} \int_{-a}^{a} |x_{c_1}^4 - a^4|\,dx_{c_1} = \frac{a^2}{4}\int_{-1}^{1} d\xi\,|\xi^4 - 1| = \frac{2}{5}a^2$$

$$e^{\tau - \tau_0} = \left|\frac{x_{c_1} - a}{x_{c_1} + a}\right| \cdot e^{2\arctan\frac{x_{c_1}}{a}}$$

$$\tau \to \infty: \; x_{c_1} \to -a: \quad |x_{c_1}+a| \approx \mp 2a \exp\left[+2\pi/4 - \tau\right]$$

$$x_{c_1} \approx a\left(-1 \mp 2\exp\left(\frac{\pi}{2}-\tau\right)\right)$$

$$\tau \to -\infty: \; x_{c_1} \to a: \quad |x_{c_1} \mp a| \approx 2a \exp\left[\frac{\pi}{2}+\tau\right]$$

$$x_{c_1} \approx a\left(1 + 2a\exp\left[\frac{\pi}{2}+\tau\right]\right)$$

$$\lim_{\tau \to \pm\infty} x_{c_1} = a\left(\mp 1 + 2\exp\left(\frac{\pi}{2} - |\tau|\right)\right)$$

$$f^{(1)} = -A_0 \dot{x}_{c_1}(\tau) \overset{\tau \pm \infty}{=} -2A_0 a e^{\pi/2 - |\tau|} \qquad W = 8a^2 A_0^2 e^{\pi}$$

$$f^{(2)} = \pm 2A_0 a e^{\pi/2 + |\tau|}$$

$$\frac{\det \hat{O}}{\lambda_0} = -\frac{1}{W^2}\left[f_1(-\beta/2) f_1(\beta/2) \underbrace{\langle f_2 | f_2 \rangle}_{\sim e^{\beta}} - f_2(-\beta/2) f_2(\beta/2) \underbrace{\langle f_1 | f_1 \rangle}_{\sim 1}\right] =$$

$$\simeq \frac{4A_0^2 a^2 e^{\pi} e^{\beta}}{64 a^4 A_0^4 e^{2\pi}} = \frac{e^{\beta}}{16 A_0^2 a^2 e^{\pi}} = \left\{ A_0 = \frac{1}{\sqrt{S_{c_1}}} = a\sqrt{\frac{5}{2a^2}} \right\} =$$

$$= \frac{e^{\beta - \pi}}{40}$$

$$F_1 = \frac{\beta}{A_0}\sqrt{\frac{1}{\det \hat{O}'}} \cdot \frac{1}{2\pi} \qquad \det \hat{O}' = \frac{\det \hat{O}}{\lambda_0} = \frac{e^{\beta-\pi}}{40}$$

$$F_1 = \beta a \sqrt{\frac{2 \cdot 40}{5 e^{\beta - \pi}}} \cdot \frac{1}{2\pi} = \frac{2\beta a}{\pi} e^{-\beta/2 + \pi/2} = \beta e^{-\beta/2} \sqrt{\frac{1}{\pi}} \sqrt{k_1}$$

$$\sqrt{k_1} = \frac{2a}{\sqrt{\pi}} e^{\pi/2} \qquad \Delta E = 2\sqrt{k_1} \exp\left[-S_{c_1}\right] = \frac{4a}{\sqrt{\pi}} e^{\pi/2 - \frac{2}{5}a^2}$$

$$E_0 = \frac{1}{2} - \Delta E/2 = \frac{1}{2} - \frac{2a}{\sqrt{\pi}} e^{\sqrt{\pi/2} - 2/5\, a^2}$$

$$E_1 = \frac{1}{2} + \Delta E/2 = \frac{1}{2} + \frac{2a}{\sqrt{\pi}} e^{\sqrt{\pi/2} - \frac{2}{5} a^2}$$