

(1)

IST on a sech-potential

$$U(x) = -2 \operatorname{sech}^2(x)$$

Maxim
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BOS

$$b(k) = 0$$

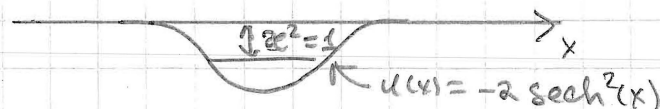
$$\mathcal{E}_1 = 1$$

$$\psi_1 = \frac{1}{\sqrt{2}} \operatorname{sech}(x) \Rightarrow c_1 = \sqrt{2}$$

$$F(\frac{z}{2}) = 2 e^{-\frac{z}{2}}$$

$$K(x, z) + 2 e^{-x-z} + \int_x^\infty K(x, y) 2 e^{-y-z} dy = 0$$

$$K(x, z) = -e^{-x-z}$$



(2)

$$K(x, z) = L(x) e^{-z}$$

$$L(x) e^{-z} + 2 e^{-x-z} + 2 \int_x^\infty L(x) e^{-y} e^{-y-z} dy = 0$$

$$L(x) + 2 e^{-x} + 2 \int_x^\infty L(x) e^{-2y} dy = 0$$

$$L(x) + 2 e^{-x} + \frac{1}{2} L(x) e^{-2x} = 0$$

$$L(x) (1 + \frac{1}{2} e^{-2x}) = -2 e^{-x}$$

$$L(x) = -2 \frac{e^{-x}}{1 + \frac{1}{2} e^{-2x}} = -2 \frac{1}{e^x + \frac{1}{2} e^{-x}}$$

$$K(x, z) = -2 \frac{1}{e^x + \frac{1}{2} e^{-x}} e^{-z}$$

$$K(x, x) = -2 \frac{e^{-x}}{e^x + \frac{1}{2} e^{-x}}$$

$$u(x) = -2 \frac{d}{dx} K(x, x) = -2 \operatorname{sech}^2(x)$$

