

zeitunabh. DGL
Schrödingergleichung

$$\left[-\frac{1}{2} \frac{d^2}{dx^2} + \tilde{V}(x) \right] \psi(x) = E \psi(x) \quad (\text{lösen in } \psi(x))$$

$$\hookrightarrow -\frac{1}{2} \psi''(x) + \tilde{V}(x) \psi(x) = E \psi(x)$$

$$-\frac{1}{2} \psi''(x) + \psi(x) [\tilde{V}(x) - E] = 0$$

führe $\psi_1 \wedge \psi_2$ ein, wobei $\psi_2 = \psi' \wedge \psi_1 = \psi$

$$-\frac{1}{2} \psi_2' + \psi_1 [\tilde{V}(x) - E] = 0 \quad | \quad \psi_2 = \psi' = \psi_1'$$

$$\bullet \quad \underline{\psi_2'} = 2 \psi_1 [\tilde{V}(x) - E]$$

$$\bullet \quad \underline{\psi_1'} = \psi_2$$

ODS:

$$\begin{pmatrix} \underline{\psi_1'} \\ \underline{\psi_2'} \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ 2[\tilde{V}(x) - E] & 0 \end{pmatrix} \begin{pmatrix} \psi_1 \\ \psi_2 \end{pmatrix}$$

Randbedingungen:

$$\left. \begin{array}{l} \bullet \psi(x) = 0 \quad \text{for } -1/2 \leq x \leq 1/2 \\ \bullet \psi(x) = 0 \quad \text{for } x > 1/2 \wedge x < -1/2 \end{array} \right\} \begin{array}{l} \phi(x) = X \\ \phi(x) = 0 \end{array}$$