

$$H^{(0)} = \begin{bmatrix} \phi_2^{(0)} & E_2^{(0)} \\ \phi_1^{(0)} & E_1^{(0)} \\ \phi_0^{(0)} & E_0^{(0)} \neq 0 \end{bmatrix}$$

1^{st} SUSY

$$H^{(1,1)} = \begin{bmatrix} \phi_{n+1}^{(1,1)} \\ \phi_n^{(1,1)} \\ \vdots \\ \phi_3^{(1,1)} \\ \phi_2^{(1,1)} \\ \phi_1^{(1,1)} \\ \phi_0^{(1,1)} \end{bmatrix} \quad H^{(1,2)} = \begin{bmatrix} \phi_{n+1}^{(1,2)} \\ \phi_n^{(1,2)} \\ \vdots \\ \phi_3^{(1,2)} \\ \phi_2^{(1,2)} \\ \phi_1^{(1,2)} \\ \phi_0^{(1,2)} \end{bmatrix}$$

$A_{(1)}$

$A_{(1)}^\dagger$

$E_2^{(1)}$ $E_1^{(1)}$ $E_2^{(1)}$ $E_1^{(1)}$

$E_0^{(1)} = 0$

$$\phi_n^{(0)}(x) = Q_0^n \left(i \frac{A \sin\left(\frac{s_1}{2a}x\right) - B \cos\left(\frac{s_1}{2a}x\right)}{A \cos\left(\frac{s_1}{2a}x\right) + B \sin\left(\frac{s_1}{2a}x\right)} \right)$$

$$\phi_n^{(1,2)}(x) = Q_1^n \left(i \frac{A \sin\left(\frac{s_1}{2a}x\right) - B \cos\left(\frac{s_1}{2a}x\right)}{A \cos\left(\frac{s_1}{2a}x\right) + B \sin\left(\frac{s_1}{2a}x\right)} \right)$$