TAILORING 3pt FUNCTIONS & INTEGRABILITY

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Tailoring... I-IV

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... (see previous talk)

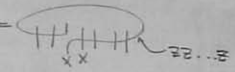
Spectrum

Eigenvalues $\hat{D} = 2g^2 \sum_{n=1}^{L} \underbrace{(1-\mathbb{P})_{n\,n+1}}_{\mathbb{H}_{n\,n+1}} + g^4$  $+ \dots$

$$\langle O_i\, O_j\, O_k \rangle = \frac{C_{ijk}}{|x_i-x_j|^{\Delta_i+\Delta_j-\Delta_k}(\dots)(\dots)}$$

Bethe Eqs

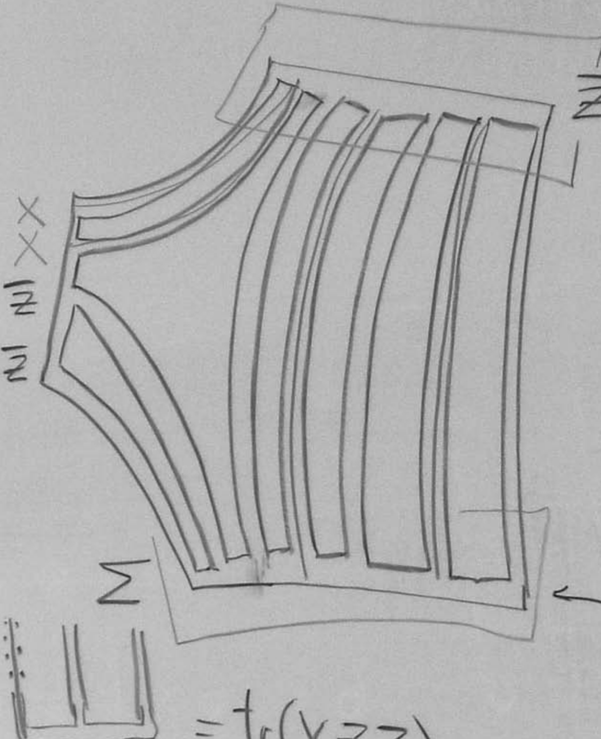
$$S_{12} = \frac{u_1-u_2+i}{u_1-u_2-i}$$



Eigenvectors $\hat{D}|\psi\rangle = E|\psi\rangle$

$$|\psi\rangle = \sum_{1\le n_1 \dots \le n_N \le L} \Bigg(\overbrace{\underbrace{\left(\frac{u_1+i/2}{u_1-i/2}\right)^{n_1}}_{e^{ip_1}}\left(\dots\right)^{n_2}\left(\dots\right)^{n_3} + \left(\frac{u_2+i/2}{u_2+i/2}\right)^{n_1}\left(\frac{u_1+i/2}{u_1-i/2}\right)^{n_2}(\dots)^{n_3} S_{12}}^{|||\, +\, X|\, +\, |X\, +\, \dots\ (N!\ \text{terms})}\Bigg) \mathrm{tr}\,(Z\dots Z \underset{n_1}{X} Z \dots Z \underset{n_2}{X} Z \dots) + \overset{\text{higher l}}{\widetilde{\delta\psi}}$$

$\mathcal{O}_3$



$\leftarrow \mathrm{tr}(Z\ldots ZXZ\ldots Z)$

$= \mathrm{tr}(XZZ)$

$$|\psi\rangle \equiv |\{u_i\}\rangle$$

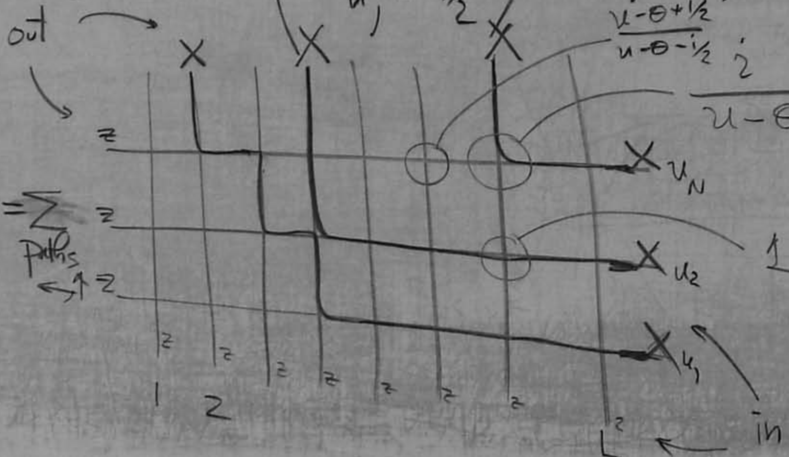
$\langle \{v_j\} \,|\, \{u_j\} \rangle \leftarrow$ main building block

generic

obey BAE

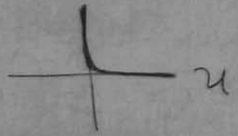
$$\left(\frac{u_j + i/2}{u_j - i/2}\right)^L \prod_{k \neq j}^{N} \frac{u_j - u_k - i}{u_j - u_k + i} = 1$$

$|\{u_i\}\rangle = \sum_{\text{paths}}$



$\frac{u-\theta+i/2}{u-\theta-i/2}$

$\frac{i}{u-\theta-i/2} =$

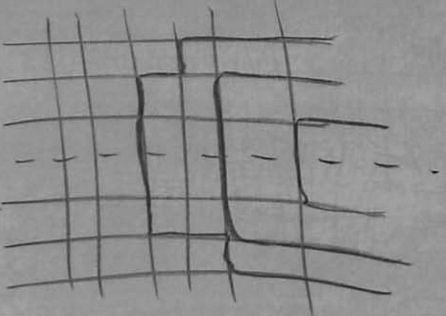


$\theta = 0$ for now

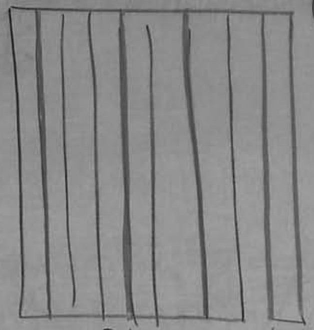
$1 = B(u_1)\cdots B(u_N)|0\rangle$

$\langle \nu | u \rangle$

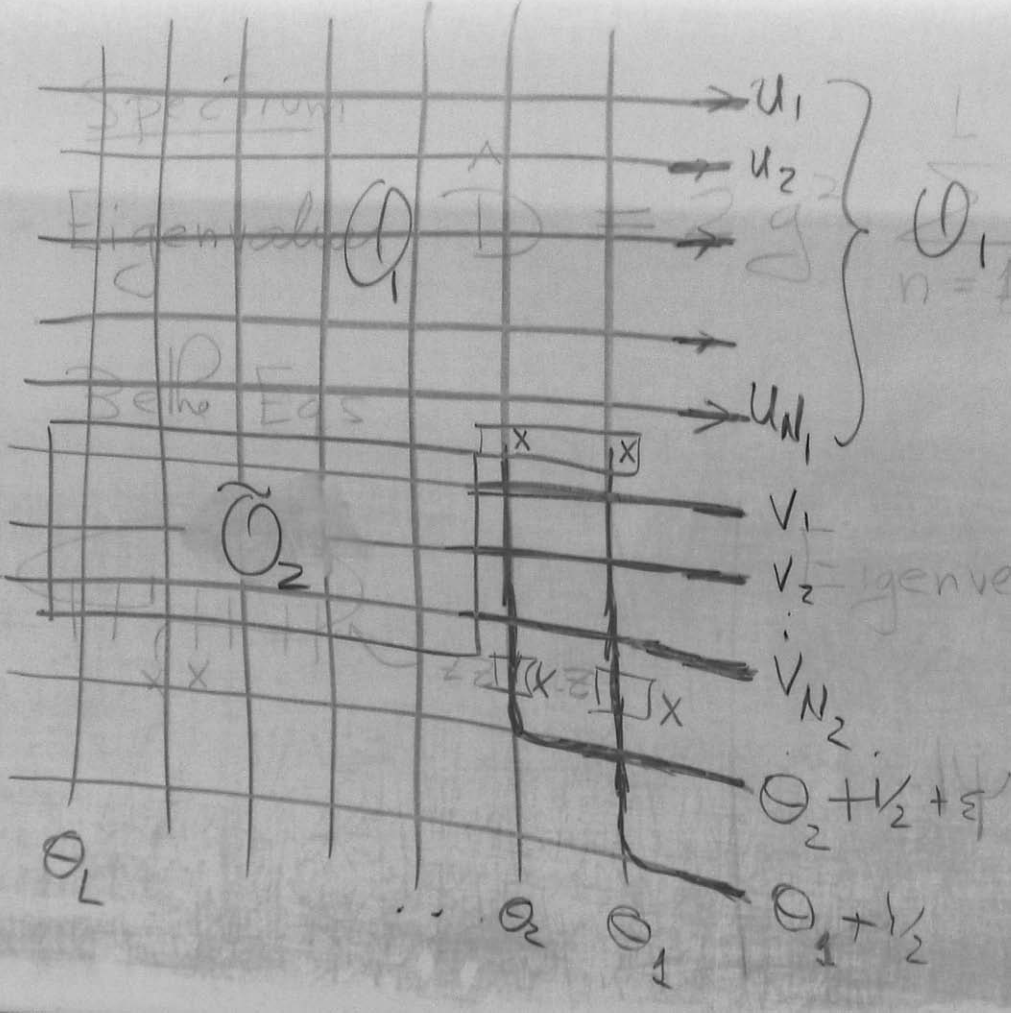
$\sum_{\text{paths}}$



$\langle \mathcal{O}_1 \mathcal{O}_2 \mathcal{O}_3 \rangle =$



$= \text{want} \stackrel{?}{=} \langle \nu | u \rangle$



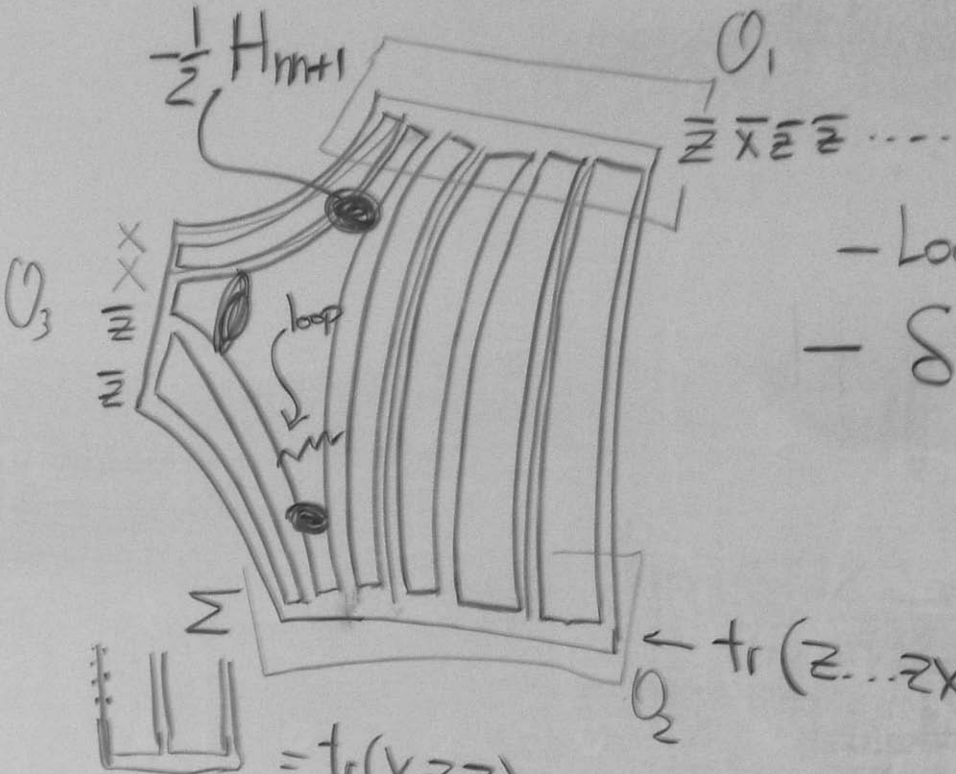
u_1
u_2
u_{N_1}
Θ_1
$\tilde{\Theta}_2$
x
x
v_1
v_2
v_{N_2}
x
x
$\Theta_2 + 1/2 + \varepsilon$
$\Theta_1 + 1/2$
Θ_L
...
Θ_2
Θ_1

$$\langle \{v_j\} \mid \{u_i\} \rangle = \det_{1<j,K<2N} \left[z_j^{K-1} + (z_j + i)^{K-1} \left(\frac{z_j + i/2}{z_j - i/2} \right)^L \right]$$

$$z_j = \{u_1 \dots u_N, v_1 \dots v_N\}$$

$$C_{ijK} = C^{(0)}_{ijK} + g^2 C^{(1)}_{ijK} + \dots$$

<u>next</u> : – Loops
– Other sectors
– Strong coupling



$\leftarrow \mathrm{tr}(Z \ldots Z X Z \ldots Z)$

$= \mathrm{tr}(XZZ)$

– Loops

$- \delta\psi = ?$

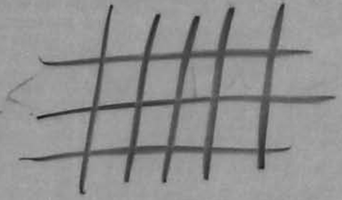
$$X / || = S_{12}$$

$$= S_{12}^{(0)}(p_1, p_2) + g^2 S_{12}^{(1)}(p_1, p_2) + \ldots$$

$$\Psi = \sum_{1 \leq n_1 \cdots \leq L} \left[\Psi + \delta_{n_1 n_2 - 1} \left(\ldots (p_1, p_2) + \ldots \right) \right.$$

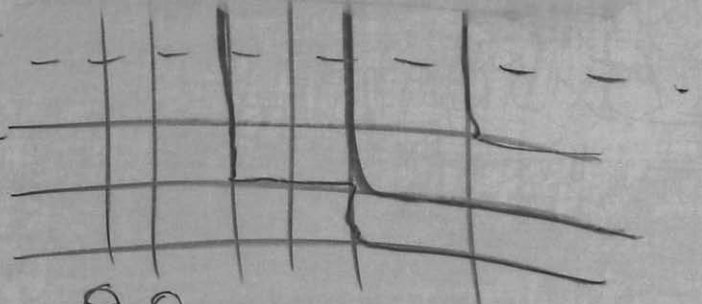
$$\langle\langle f_{sym}(\{\theta\})\, g(\{\theta\}) \rangle\rangle = \langle\langle f_{sym} \rangle\rangle \langle\langle g \rangle\rangle$$

$$\langle\langle f \rangle\rangle, \quad f =$$



$\langle\langle f \rangle\rangle \langle\langle g \rangle\rangle$

$$\Psi = (1 - E_u \mathbb{H}_{L1}) \left(1 + \frac{g^2}{Z} \sum_{n=1}^{L} \left(\partial_{\theta_n} - \partial_{\theta_{n+1}}\right)\right)^2 \sum_{\text{paths}}$$



$$g^2 \sum \frac{1}{u_j^2 + \frac{1}{4}}$$

$$C_{123} \stackrel{?}{=} \left(\!\left(C^{(0)}_{123}(\{\theta_j\}) \right)\!\right) \cancel{- \text{Cross-terms} + \text{B. Effects} + \text{Loops } (\text{ins } \mathbb{H})}$$

CANCEL!

$$\left(\frac{x(u + i/2)}{x(u - i/2)} \right)^{L}$$

naturally appear and lead to obvious higher loop guesses.