$\underline{\underline{2n}}$ $\quad (2n-1)!!$

$$T_n(N) = \sum_{\text{по всем склейкам}} N^{\#\,\text{вершин}} =$$

$$= \sum_{g=0}^{\infty} \varepsilon_g(n)\, N^{n+1-2g}$$

$$T(N,s) = 1 + 2Ns + 2s \sum_{n=1}^{\infty} \frac{T_n(N)}{(2n-1)!!} s^n$$

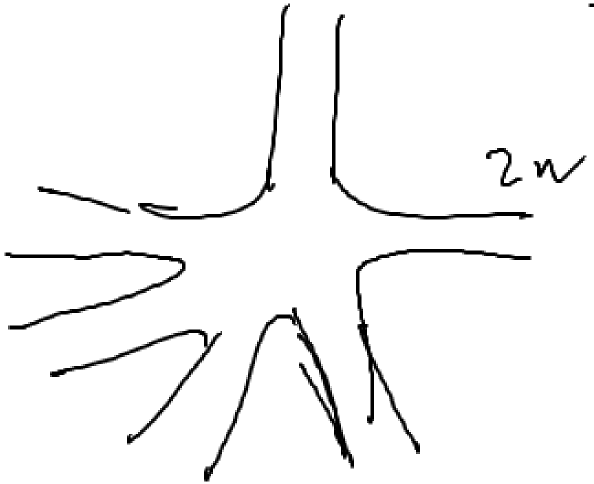
$$= \left(\frac{1+s}{1-s}\right)^N$$

$$\frac{T_n(N)}{(2n-1)!!}$$

$$\frac{2^{\frac{N(N-1)}{2}}}{(\sqrt{\pi})^{N^2}} \int \mathrm{Tr}(H^{2n})\, e^{-\mathrm{Tr}(H^2)}\, dh_{ii} \prod_{i<j} d\,\mathrm{Re}\,h_{ij}\, d\,\mathrm{Im}\,h_{ij} = \langle \mathrm{Tr}\, H^{2n} \rangle$$

$$\mathcal{H}_{N\times N}$$

$$\overline{H}^T = H^* = H$$



$$\langle 1 \rangle = 1$$

$$\int \cancel{1} \cdot e^{-\left(\sum h_{ii}^2 + \sum_{i<j}\left(2(\mathrm{Re}\, h_{ij})^2 + 2(\mathrm{Im}\, h_{ij})^2\right)\right)} \, \frac{dh \ldots}{\left(\sqrt{2}\right)^{N(N-1)}}$$

$$\mathcal{H}_{N\times N}$$

$$= \left(\sqrt{\pi}\right)^N \cdot \left(\frac{\sqrt{\pi}}{\sqrt{2}}\right)^{\frac{N(N-1)}{}} = \left(\sqrt{\pi}\right)^{N^2} \cdot \left(\frac{1}{\sqrt{2}}\right)^{N(N-1)}$$

$$\langle \mathrm{Tr}(H^{2n}) \rangle = \sum \langle h_{i_1 i_2} h_{i_2 i_3} \quad h_{i_{2n} i_1} \rangle$$

$$1 \le i_1, \quad , i_{2n} \le N$$

$$\langle h_{ij} h_{ji} \rangle = \frac{1}{2}$$

$$\sum \frac{\langle h h \rangle \langle h h \rangle \langle h h \rangle}{2}$$

$$\langle h_{i_1 i_2} h_{i_3 i_4} \rangle$$

$$\sum_{\text{по всем сх.}} \frac{N^{\#\text{граней}}}{2^n}$$

$$\langle h_{ii}^2 \rangle = \frac{1}{2} \qquad \langle h_{ij} h_{ji} \rangle = \frac{1}{2}$$

$$\langle \underline{h_{ij} h_{ji}} \rangle = \left\langle (\mathrm{Re}\, h_{ij})^2 + (\mathrm{Im}\, h_{ij})^2 \right\rangle$$

$$= \langle (\mathrm{Re}\, h_{ij})^2 \rangle + \langle \quad \rangle \qquad \frac{1}{\sqrt{\pi}} \int y^2 e^{-y^2} dy =$$

$\frac{1}{4}$ $\frac{1}{4}$

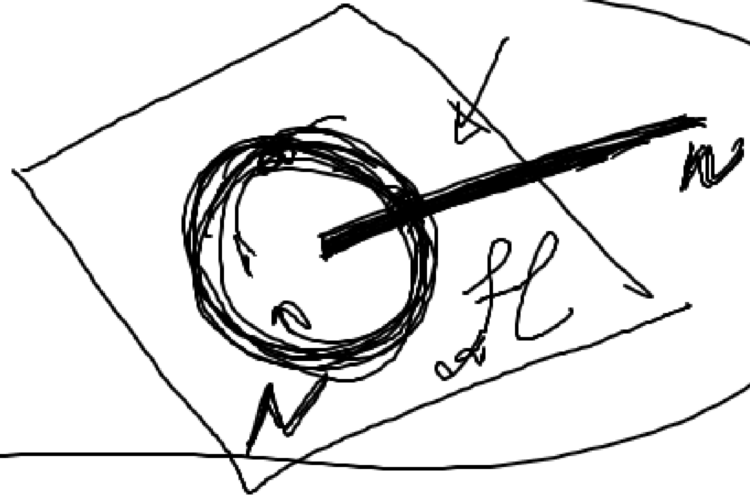
$$\frac{1}{\sqrt{2}\sqrt{2}\sqrt{2}} \frac{\sqrt{2}}{\sqrt{\pi}} \int \sqrt{2}\sqrt{2} x^2 e^{-2x^2} d\sqrt{2}x = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$\langle \mathrm{Tr}(H^{2n}) \rangle = \frac{T_n(N)}{2^n}$$

$$H = U^{-1} \Lambda U$$

$M_{N \times N}(\mathbb{C})$

U



$$\mathrm{Tr}\left(U^{-1} H U\right)$$

U - унит

$$= \mathrm{Tr}\left(U U^{-1} H\right)_2$$

$$U^{*} U = E$$

$$= \mathrm{Tr}(H)$$

$$\overline{U}^{T} (\ ,\ )$$

$$e^{-(\mathrm{Tr}\, H^2)}$$

$$\underline{\prod dh_{ii} \prod d\mathrm{Re}\, h_{ij}\, d\mathrm{Im}\, h_{ij}}$$

$$\boxed{\sqrt{\det G_K}\; dx_1 \quad dx_m}$$

$$\boxed{\sqrt{\det G}\; dy_1 \quad dy_n}$$

$$\sum \; dx_j\, dx_k$$

$$dM = d\begin{pmatrix} a_{11}+ib_{11} & & a_{1n} \\ & & \\ & & a_{nn} \end{pmatrix}, \quad \in M_n$$

$$\mathrm{tr}\left((dM)(dM)^{+}\right) = \sum_{1 \le i,j \le N} (da_{ij})^2 + (db_{ij})^2$$

$$= \sum (dx_{ii})^2 + \sum 2(da_{ij})^2 + 2(db_{ij})^2$$

$$\sqrt{\det} \prod dh_{ii} \, d\mathrm{Re}\, h_{ij} \, d\,\mathrm{Im}\, h_{ij}$$

$$\sqrt{2}^{N(N-1)}$$

$$\begin{pmatrix} 1 & & & & & \\ & 1 & & & & \\ & & 1 & & & \\ & & & 2 & & \\ & & & & 2 & \\ & & & & & 2 \end{pmatrix} \sqrt{2}^{N(N-1)}$$

$$\frac{1}{(\sqrt{\pi})^{N^2}} \int (a_{ij})^2 e^{-\sum a_{ii}^2 + 2|h_{ij}|^2} (\sqrt{2})^{N(N-1)} \, d\cancel{x} \ldots =$$

Pd

$$= \frac{1}{2} \frac{1}{\sqrt{\pi}} \int \cancel{2} a^2 e^{-2a^2} \sqrt{2} \, da =$$

$$\frac{\langle \mathrm{Tr}(H^{2n}) \rangle}{2^{m}} = \int_{\mathcal{U}_N} \overline{\; d\ldots \;} \cdot \int_{\mathbb{R}^N} \overline{\mathrm{Tr}(M^2)} \cdot$$

$$\Rightarrow \left| \begin{matrix} 1 & 1 & \cdots & 1 & 1 \\ \lambda_1 & \lambda_2 & \cdots & \lambda_{N-1} & \lambda_N \\ \lambda_1^{N-1} & & \cdots & & \lambda_N^{N-1} \end{matrix} \right|^2 \underline{d\lambda_1 \ldots d\lambda_N} \; V(\mathcal{U}_N)$$