Le in Trieste

May-29-09 3:36 AM T.O. time

For $A \in Mat(n \times n, \mathbb{C}G)$ define

$$\det_{Le} A = \exp -\sum tr \frac{(1-A)^p}{p} \qquad \begin{pmatrix} \text{more} \\ \text{or} \\ \text{less} \end{pmatrix}$$

where the trace of an element of $\mathbb{C}G$ is the coefficient of the identity.

Added May 31, 2009:

1. For a finite G, an element of $\mathbb{C}G$ is an $|G| \times |G| =: g \times g$ matrix via the regular representation and we have

$$Mat(n \times n, \mathbb{C}G) \to Mat(ng \times ng, \mathbb{C}) \xrightarrow{\det} \mathbb{C}.$$

Is this composition equal to the Le determinant?

2. What's the Le determinant for $G = \mathbb{Z}$?

$\Rightarrow$ Probably, ordinary determinant for Laurant-poly-valued matrices, followed by "take the constant term. Cauchy would write this as

$$A \in M_{n \times n}(\mathbb{Z}[t, t^{-1}]) \Rightarrow$$

$$\det_{Le} A = \frac{1}{2\pi i} \oint_{|t|=1} \det A \frac{dt}{t}$$

Is this related to what he said about the Mahler measure?